FOOD MANUFACTURE

Incorporating Food Industries Manual

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FOOD MANUFACTURE

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CONTENTS

	Page
Editorial	481
Developments in Food Analysis. *D. W. Grover, B.Sc., F.A.C.I., F.R.I.C.*	485
Cartons and Colour	489
Quick Freezing in Lincolnshire	490
Statutory Instruments	494
The Veterinarian and Meat Production	495
Taste Differences in Individuals	497
New Uses for Milk By-products	498
The Nutritive Value of Butterfat	499
Modern Chocolate Refiners. *H. K. Wiemer*	502
Problems of the Fats and Allied Industries. *John Seaman, A.M.C.T.*	505
Practical Food Inspection	511
Trade News	512
Information and Advice	527
Recent Patents, Trade Marks, and New Companies	528

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FOOD MANUFACTURE

Vol. XXIV, No. 11 November 1, 1949

Chemistry à la Carte

WHENEVER the food and population problem is discussed, the main emphases are laid upon agricultural expansion and to varying degrees upon population restriction. The practical possibilities of synthetic foods are either ignored or given a minor place. Professor Eugene Rochow of Harvard University at a recent meeting of the American Chemical Society presented the case for synthetic foods in a chemically transformed world. The population he envisaged was 15 billion —nearly eight persons for every one we have today.

For this, however, all our present eating traditions would have to disappear. In 1947, five acres of arable land were required to feed each person in the United States; on this basis the cultivation of all land other than swamps, deserts, and rocky areas would support about 300 millions at the most. Meat and eggs as protein-supplying foods would have to be abandoned; the animals producing these foods consumed far too much food to be regarded as efficient. For example, a beef steer converted only 12 per cent. of its diet into meat even when well fed. Eventually we would be forced to produce artificial proteins by synthesis from amino acids, and probably to use yeast and other micro-organisms for producing suitable amino acids from the nitrogen of the air. Prof. Rochow predicted large-scale developments of the German idea of synthesising edible fats from minerals like coal, which might result in the allocation of the world's remaining coal resources to the food industry alone.

The Professor discounted the value of converting forest lands into farmland. Trees should continue to be grown and their materials used as the basis of foods. Man could not eat cellulose with nutritional advantage, but chemists could convert cellulose into digestible sugars and carbohydrates. By this method we could satisfy practically all our calorie needs. If we faced the world food problem along these lines, a population of 15 billions—including one billion in the United States—" would not seem unreasonable."

Our own reaction to this sweeping picture of the future centuries can only be uncomfortably mixed. In one sense, of course, this viewpoint is even more optimistic than the recent and encouraging " science-plus-agriculture " address by Sir John Russell to the British Association. But there our respect for its optimism must stop, and the more natural fear of an increasingly synthetic diet take its place. If this must be the way by which future billions will exist, there are many compensations for living and dying in the more thinly occupied world of 1949; and even present rations take on the appearance of good, square meals.

New Crisis for Groundnuts Scheme

That there was a danger of the East African groundnuts scheme being bogged down in frustration, with the consequent draining away of over £25 million of the British taxpayers' money into the red soil of Africa, was stressed by Hamish Davidson in a recent article written from Kongwa on the new crisis facing the project (*Daily Telegraph*, September 13, 1949). The author mentions the sense of menace and insecurity which exists in Kongwa by reason of the new policy of staff reductions and financial control in addition to the sense of frustration which has resulted from an attempt to carry through a task made impossible by the use of inadequate and unsatisfactory equipment, by the existence of primitive conditions, and an imposed time limit that made no allowance for the tremendous difficulties involved.

However, it is encouraging to hear of the " burning faith " of so many men and women who have gone to Africa, determined to turn a great conception into an inspiring reality despite mistakes in planning and execution, and despite the deadweight of rash promises which cannot be fulfilled. But, the author comments, there are others of lesser moral fibre who are saying even now that " the groundnut scheme is finished." They do not lack evidence of inefficient administration, and the derogatory stories they often spread may tend to reduce the available labour force which the

scheme must be able to draw on at home for the future.

However, there are those who are of the opinion that the choosing of Kongwa as a site for the original project was a bad one. It was selected without adequate consideration of the rainfall; moreover, not enough was known of the nature of the Kongwa soil, which is a clay that bakes like brick during the dry weather, causing excessive wear and tear on implements. Further, the whole scheme was initiated without that essential period of preliminary experimentation which must precede developments in new fields; by dispensing with this, the scheme has involved the expenditure of huge sums of money which could have been saved had it been proceeded with in a more circumspect manner.

For this reason we do not agree with Mr. Davidson's statement that if Great Britain had not backed the groundnuts project she might have been in danger of losing both her place and her prestige in Africa. The reverse would appear to be the case as prestige has been lost owing to the neglect of what are really essential first considerations.

Problem of Britain's Pilchard Industry

Cornish canners and fishermen are up in arms because the Ministry of Food is importing tinned pilchards from Japan, which are being sold in this country at a price with which the home canning industry is unable to compete.

The Cornish chairman of the Federation of English and Welsh Inshore Fishermen, Mr. G. C. Gould-Porter, said it would come as a great surprise to many people to know that Japanese tinned pilchards were being imported into this country. He pointed out that some tins were on sale recently at St. Austell, the price being 1s. 6d. for a 15 oz. tin.

The fact that the Japanese were sending tinned pilchards to us to sell at a cheaper price than Cornish tinned pilchards had been causing disquiet in the industry. There was no doubt that the reason for that cheaper price was the fact that their wages and standard of living in the past was far below our own. According to Mr. Gould-Porter, it seemed certain that it would not now be possible for the Government to import any more Californian pilchards, as they did this year (to many minds an unnecessary step), when there still remained the problem of how pilchards packed in Great Britain were to be marketed in the coming season.

Dealing with the effect the devaluation of the £ was likely to have on the Italian fish trade, Mr. Gould-Porter said the effect on the export trade of cured pilchards could not be fully appreciated until the position of the £ in relation to the lira was clarified. In any case it was not anticipated that it would ease the difficult situation that was at present facing those engaged in the export to Italy of cured pilchards.

Packaging and Metal Containers

In a paper read before the Food Group and the London Section of the Society of Chemical Industry, Mr. R. K. Sanders, M.A., Head of Research Division, The Metal Box Co., reviewed some aspects of packaging and metal containers. The range of his talk was wide but there was one point of special importance to food canners.

Dealing with the subject of the prevention of leakage of bacteria into metal containers which lies at the heart of the canning industry, and on which a great deal of work has been done in different countries, there was a problem, said Mr. Sanders, which is still shrouded in mystery. Beyond a certain degree of faultiness, demonstrable either visually or by measurement, the admittance of bacteria through imperfect seams can be accurately predicted. It is also safe to predict that seams which leak under accepted air pressure tests will admit bacteria. Bacteria do, however, pass through seams which, according to all the canons, should be sound, and how they do so is not yet fully understood.

In this connexion three facts are established beyond dispute: (i) that blown cans whose seams meet fully the dimensional requirements of standard practice and which are known to contain the correct amount of gasketing compound can be shown from bacteriological evidence (essentially the establishing of the presence of mixed cultures of non-heat-resistant organisms) to have blown because bacteria gained entry through these apparently perfect seams; (ii) that such cans do not leak at the time when they are blown. At least it is self-evident that they do not leak outwardly under pressures which have been known to exceed 60 lb./sq. in.—otherwise they would not be blown; (iii) that the amount of spoilage experienced with apparently sound cans can be greatly reduced by chlorinating—and thus maintaining sterile—the water in which the cans are cooled after processing.

As has been said, the way by which bacteria enter apparently sound cans is not clear. Certainly

can seams, in spite of the construction of the ends which is expressly devised to minimise strain on the seams, are under stress during processing, and it may be that leakage takes place at the moment—and only at the moment—when the seam, in contact with contaminated cooling water, changes its shape as a result of the " flipping " of the end from the convex (internal pressure) to the concave (internal vacuum) condition. In this connexion it must be remembered that if the cooling water contains a million organisms per ml., only one millionth of a ml. need pass through the seam in order to destroy the sterility of the contents.

Whatever may be the cause, the effect on present-day canning practice has been to increase in ever-widening circles the practice of chlorination of cooling water. The effect on research and development technique has been to introduce the process known as the " bio-test."

Since pressure tests are known to be useless in this connexion, modern practice in the testing of new sealing compounds, new seaming practices or new can manufacturing techniques is to fill the test cans and standard controls with a medium nutrient to some gas-producing organism, such as *B. aerogenes*, to close them, process them, and cool them in water infected with the selected organism and count the number of swelled cans in the test and control cans after two weeks' storage.

Silicone Glazes for Bread Tins

As a result of the study of the possible effects of absorption and ingestion of new products of chemical origin finding their way into baked goods, J. B. M. Coppock, H. Hulse, and A. Urie of the British Baking Industries Research Association and the Royal Technical College, Glasgow, have come to the conclusion, communicated in a letter to the *British Medical Journal* (September 10, 1949), that in view of the data they put forward and the earlier toxicological findings reported by V. K. Rowe, H. C. Spencer, and S. L. Bass (*J. Ind. Hyg. Toxicol*, **30**, 332, 1948) they do not consider that silicone pan glazes in bread production involve any potential harmful effect on the consumer, and that the very small amount of silicon naturally present in bread is not materially increased by this process.

In the particular instance of silicone pan glaze it has already been shown (*loc. cit.*) on experimental animals that this substance is very low in chronic oral toxicity. It is the authors' view, however, that analytical evidence in a case of this type removes some of the uncertainties in translating results on experimental animals into terms of human metabolism, and that problems generally of this nature require investigation by as many diverse techniques as possible.

Investigations have been carried out regarding the possible absorption of the resin by bread baked in silicone-coated tins, and it has been impossible to detect by chemical means any increase in the proportion of silicon present in the crust of the loaves so obtained, irrespective of the method of application of the silicone solution to the surface of the tin. The method used was to compare the silicon content of the crust of a loaf baked in a silicone-treated tin with the content of the crust of a loaf prepared from the same dough baked in a greased tin—the crusts being treated chemically to convert any silicone present to silica, followed by colorimetric determination of the total silica in each case.

The average loss in weight of a normal silicone film during a series of baking experiments was, with very slight deviation, 0·0000006 g. per sq. cm., or 0·00045 g. per 2 lb. loaf tin. Even if it is assumed that the entire loss is due to absorption by the loaf, this loss would only represent a final proportion of approximately 0·00005 per cent. of silicone in the loaf, or less than 0·5 part per million of silicon.

The authors sound a warning against the stacking of the tins between bakings owing to the fact that silicone glaze is fairly easily scratched by sharp metal, and such stacking might cause slight removal of the coating.

Starch Dust Explosions

Some manufacturers may still not know that starch dust can be explosive under certain conditions, and that high atmospheric humidity or the normal moisture content of starch will not necessarily prevent explosions.

In an article by Irving Hartmann and John Nagy of the Explosives Branch of the U.S. Bureau of Mines (*Chemical and Engineering News*, **27**, 29, 2071), some of the factors which govern dust explosions are explained.

In general, dust explosions can be produced only when inflammable dust is dispersed and ignited in air or in some other gaseous atmosphere which will support combustion. However, even undispersed dust on exposed surfaces in a plant can contribute to an explosion, since a relatively minor initial disturbance might throw it into

suspension and cause a violent secondary explosion.

Numerous experiments made with coal dust and some work with starch and other dusts have shown that even moist dusts can produce violent explosions if thrown into suspension in air and ignited. These studies indicate that, as a rule, neither high humidity in the air nor high natural moisture content of dusts can be relied upon to prevent dust explosions.

As part of a research programme designed to reduce explosion hazards in mines and in industry, the U.S. Bureau of Mines has investigated the explosive properties of many dusts and powders. Samples recently studied included four ordinary corn starches, one mixture of 95 per cent. corn starch and 5 per cent. potassium bromate, one mixture of corn plus wheat starch and 5 per cent. potassium bromate, one mixture of corn plus wheat starch, 5 per cent. potassium bromate, and 10 per cent. inert inorganic salts, and one mixture of corn plus wheat starch, 5 per cent. potassium bromate, and 30 per cent. inert inorganic salts. All tests were made on the dusts of 90 per cent. or more through 200-mesh fineness after drying at 75° C. for twenty-four hours.

The tests showed that dust clouds of starch can be ignited readily by hot surfaces, by weak electrical sparks, and also by other common igniting sources. Undried dusts were more difficult to ignite and produced less severe explosions than similar dried samples, but the moisture definitely did not eliminate the explosion hazard. Addition of 5 per cent. potassium bromate to starch increased the explosibility somewhat, but not unduly. The addition of a greater proportion of bromate to starch might, however, introduce more severe fire and explosion hazards. The addition of small quantities of inert inorganic constituents to the starch-bromate mix reduced but did not eliminate the danger of explosions.

Pasticcieri e Confittieri

Our tooth, if that drilled, filled, pegged, stopped, and capped relic can be so called, is sweet. From its possession arises our plaint—where are the sweets? By which we do not mean those productions of the manufacturing confectioners which Geordie calls, or in pre-war B.B.C. days called "Bullets," but rather the third course of the average dinner.

We are familiar with that apple pie in the U.S.A. served either with or without ice cream. We always had the idea that this was not made in the kitchen of the magnificent Pentmore-Suttler nor in the chain tea-shop, nor in that U.S. particularity "the diner." Since it seemed to us improbable that so many and so much could be made in so many places for so many patrons and be so similar, we felt it must emerge from some massive central Kitchen. We were cheered, as verifying our perspicacity, to observe when looking out of the window of the carriage of the air-conditioned pressurised railroad flier which bore us through the mists of California, a sign "Sara L. Muggins, Home-made Apple Pies,"—a sign rearing above a building some 1,000 feet long with every appearance of a complete mass production outfit, although we could not help inconsistently wondering behind which of the multitude of windows dear old Sara Muggins was to be found bending over her homely cooking.

Turning to recent times, we felt that our last hope of once more tasting those magic productions of the *pâtissier* would be realised during our summer trip on the Continent. The anticipation of our first dinner in Paris was pleasurable. Alas! in France sugar is scarce and the sweet was *Fruits en Saison ou Glace*. Thence to Italy, where the sweet was *Fruits en Saison ou Glace*. There was still hope. We were returning *via* Switzerland—surely this home of the *gourmet* would satisfy our now almost unbearable craving. We arrived at the hotel whose *cuisine* had always been loudly proclaimed as the finest in Europe. That day has come and gone. At dinner we were offered *Fruits en Saison ou Glace*. "But the sweet," we cried despairingly. "Ah," said the waiter, "jawohl!" He placed before us Caramel Cream.

Another Fishy Yarn

It is not such a far cry from the bent pin and piece of string of youthful piscatorial pursuits in muddy pools to the waters of Penzance's Mount's Bay if a recent story appearing in the daily Press is to be believed.

The protagonist, a young veterinary student on holiday in Penzance, was walking one night along the promenade when he saw a huge fish, teeth bared, heading straight for the beach. Off came the student's shoes, and to continue the story in his own words: "I hastily made a noose of the shoe laces and cast it into the fish's mouth. Luckily it caught on to some of the teeth and I was able to tow it ashore."

At least this fisherman was able to produce his catch as the one that did not "get away." The 20 lb. angler fish, 3½ feet long, provided an enjoyable meal for twelve.

Developments in Food Analysis

D. W. GROVER, B.Sc., F.A.C.I., F.R.I.C.
Lecturer-in-Charge, Food School, Sydney Technical College.

The developments in methods of analysis for such foodstuffs as meat, fruit, vegetables, fats and oils, sugar and starches, preservatives, and flavouring with references to the literature are outlined in this review, which also deals with the increasing application of the filth test and available methods for the determination of traces of metallic contaminants in foodstuffs.

A NOTABLE development during recent years has been the increasing application of tests for contamination of foods by what is described as filth. What is usually looked for in these tests is rodent excrement and insect fragments, items which indicate exposure of the materials at some time during its history to infestation. Detection of this filth is based upon a separation of rodent hairs and particles of insects from the sample by selective wetting and flotation with oil followed by microscopic identification and counting.[1]

Several novel features are described by British workers in a paper dealing principally with cereal products.[2] Particularly interesting is the procedure evolved for distributing the contaminants as concentrated in oil upon a glass slide. An improved method of digestion is also described in this paper.

Although the analytical methods appear simple, considerable experience is required before concordant results can be obtained by different analysts. Errors arise when the sample contains large quantities of solid matter not broken down by acceptable methods of digestion. Under such conditions a troublesome quantity of particulate material on the final preparation, filter paper, or slide renders detection and identification of hairs and insect fragments somewhat unreliable.

Storage Conditions

The extensive applications of filth tests with stringent limits require and should lead to a considerable improvement in storage conditions. Contamination can occur at numerous stages in the passage of food materials from the point of production to the final packaging. In the case of cereals it has been established that rodent filth accumulates in corn ricks and that it can be particularly troublesome in whole-wheat products. This kind of filth, even in minute amounts, is obviously undesirable owing to the abhorrence which its known presence engenders in the mind of modern civilised man. Any direct health menace is, however, rather dubious. Stringent application of standards in this field will depend to a great extent upon whether conditions of plenty or scarcity exist—both of the foods themselves and of the structural materials required to eliminate contamination. It is undoubtedly largely for this reason that such standards have first been applied on a large scale in the United States of America.

Use of Organoleptic Tests

Traditional methods of analysis are in many cases completely inadequate for the purpose of quality assessment of food, quality in this case being eating quality. Even when the chemical basis of quality is fairly well understood, as of the deterioration of fats, organoleptic tests are frequently necessary to supplement more formal analytical methods. The increasing precision of organoleptic tests and the development of exact methods for their use make them a powerful weapon in the armoury of the food chemist. The stage has been reached when they may be regarded as analytical methods.

The publication of a series of papers dealing with this subject by members of the staff of the Low Temperature Research Station, Cambridge, is therefore of some interest to analytical chemists concerned with food products. The first of the series[3] deals with animal products—carcass meat and dried egg—and contains a discussion of the general principles involved.

Statistical Methods

The impact of statistics on the interpretation of analytical results has been discussed in previous years. Recent tables[4] indicate very clearly how even the most exact analysis is incapable of determining precisely the quantities of ingredients used in preparing a food product. By the use of these tables the actual range of ingredient composition which is reasonably compatible with the observed analysis can in many cases be calculated. The dilemma of those responsible for enforcing food regulations is placed clearly and quantitatively: what risk of the wrongful condemnation of a satisfactory article should be balanced against the risk of allowing faulty material to pass uncondemned?

The Temple cryoscope in use. This apparatus embodies the Hortvet cryoscope, which is incorporated in a refrigerating unit using brine to freeze the milk instead of evaporated ether as in the small bench model cryoscopes. The use of the Temple modification is of advantage where a series of samples has to be examined, as there is a considerable saving of time.

Dairy Products

Further data[5] concerning the freezing point of bulk milk in more than 1,000 gallon lots confirm the utility of this figure as an indication of watered milk. For bulk milk watering may be presumed if the depression of freezing point (Hortvet) exceeds 0·539° F. The amount of added water is then calculated from the formula 100 $(0{\cdot}544 - \triangle)/0{\cdot}544$.

Early stages of the activity of certain proteolytic bacteria, which ultimately give rise to the presence of indole in milk and cream, is preferably detected by an estimation of tryptophane, an intermediate product.[6] Tryptophane is dissolved from the sample by acetone adjusted to a concentration so that proteins are precipitated but salt solutions do not separate. The final determination is based upon a colour reaction with p-dimethylamino-benzaldehyde in the presence of a strong acid and an oxidising agent. Normal milk, cream, and butter, or cream soured by lactic acid producing bacteria, have a tryptophane content of not more than 4·5 parts per million. Cream soured by mixed culture (*i.e.* without a starter) contained 28 p.p.m. in ten days and over 100 p.p.m. in forty-six days.

The use of sodium alkalies to neutralise milk prior to drying may be detected by determining the sodium : chlorine ratio.[7] For untreated milk powders the ratio averaged 0·47 with a standard deviation of 0·03. If the sodium content is plotted against the chlorine content (both expressed as %) neutralised milks lie beyond the line representing the equation: % Na = 0·62% Cl − 0·10.

Conflicting opinions on the reliability of the methylene blue test as an indication of the hygienic quality of ice cream have been published. The method was proposed by the Public Health Laboratories of the Ministry of Health.[8] Clayson and Pirie[9] conclude that the test is not reliable. Organisms surviving the heat treatment proposed for ice cream reduce the dye, and the rate of reduction is influenced by the composition of the mix. Watson, Yorke, and Davis,[10] however, report considerable success with samples drawn in London from June to October, 1947. Good correlation between the test and plate count was observed, and a high proportion of samples containing faecal coli were selected. They conclude that the proposed test gives an indication of the care taken in manufacture and distribution.

The egg content of preparations consisting of cereals and dried egg can be determined with fair accuracy by an estimation of phosphatide phosphorus. Twelve determinations on dried egg range from 1·33 to 0·99 (expressed as P_2O_5). The corresponding figures for cereals are: soya flour 0·14 per cent., wheat flour 0·028 per cent. to 0·020 per cent., barley flour 0·013 per cent., oatmeal 0·038 per cent., and cornflour 0·00 per cent.[11]

Use of Chromatography

Chromatography has been applied to the separation and determination of lactic and succinic acids in milk and egg products respectively.[12] These acids are produced by bacterial decomposition, of which the proposed method provides a useful indication. The acids are first separated as barium salts. The chromatogram is developed on a column of silica gel containing dilute sulphuric acid, using n-butanol/chloroform as the mobile solvent. Estimation is by titration with standard barium hydroxide solution and the barium salts are identified microscopically.

Meat Analysis

German methods for the analysis of sausages, particularly those containing vegetable additions (*e.g.* cabbage), have been published.[13, 14, 15] The analyses cover moisture, fat, added water, vegetable additions, chloride, nitrite, chlorate, fluoride, acidity, rancidity of fat, and calorific values.

Ingram and Bryan[16] have published a further

paper dealing with the determination of chloride in meat products. They propose a modification of the electrometric titration method based upon observations on the combination of silver with meat substances under various conditions.

Fruit and Vegetables

From a comparison of various types of apparatus for use in the determination of volatile oil in citrus juices, it is concluded that the McKinnis is the most convenient and accurate.[17] The apparatus has the normal feature of an oil trap placed after the reflux condenser. To overcome the tendency for oil drops to be retained in the condenser, the use of a few drops of wetting agent at the end of the distillation is recommended. An entirely different method is employed by Burdick and Allen.[18] To 100 ml. of juice are added 5 ml. of acetone, and the mixture is rapidly distilled to give 50 ml. of distillate. Five ml. of the latter are diluted with 10 ml. of water, and the turbidity is measured by means of a photoelectric absorptiometer. Data are given for interpretation of the result.

The background colour of fruit is a better index of ripeness than any local colour caused by exposure to the sun. It is for this reason that the various colour charts for inspecting fruit before harvesting are based upon background colour. During ripening the amount of green pigment decreases. This is made the basis for measuring the ripeness of canned peaches and apricots.[19] The fruit is macerated in a Waring blender with ether and the light absorption of the extract measured at 665 mμ. A fluorimetric method can be used for the same purpose.

Fats and Oils

A new procedure for determining linoleic acid in edible fats which is simpler to perform than the thiocyanogen method of Kaufmann, which requires for success the rigid exclusion of water from the reaction mixture, does not call for expensive and consequently rare apparatus as does spectrophotometric measurement after isomerisation with alkali.[20] The proposed method involves oxidation of the mixed glycerides with potassium permanganate in alcohol. Rupture and oxidation at the double bonds occur, giving rise to steam volatile acids and acid glyceride residues (azelaoglycerides). The volatile acids are removed in the standard Polenske apparatus, the acid value of the glyceride residues being determined by titration with alkali. The information obtained can be combined with the figures for total fatty acids and iodine value to solve an equation for the linoleic acid content. The results compare very favourably with those obtained by the cyanogen and isomerisation methods. The method can be extended with very little loss of accuracy to determine the total unsaturated acid of oils containing more than two unsaturated acids.

The carry-over of the antioxidative capacity of a shortening to baked goods prepared with it is associated with the partition coefficient of the antioxidant between the fat and water.[21] A laboratory test based upon this involves mixing fat and water at 100° C. for fifteen minutes, separating the aqueous phase, and removing the antioxidant from the remaining fat with 80 per cent. alcohol. The antioxidant may be determined by suitable analytical procedures which are described for gallic acid, pyrogallol and its dimethyl ether, gum guaiac, and nordihydroguaiaretic acid.

Sugars and Starches

The University of Bristol Research Station, Campden, has published the standards now used for the acceptance of canners' sugar.[22] Not more than 50 flat-sour spores shall be detected per 10 g. of sugar. Limits are also imposed for thermophylic anaerobes and sulphide spoilage spores.

Methods used by the Dutch cereal research laboratory for the determination of sugars in rye milling products are to be published, the first paper

Preparing a methylene blue culture.

being concerned with pre-existing reducing sugars.[23] A clarified aqueous extract is fermented in stages by *Saccharomyces cerevisiae* and *Torula cremoris*. Reducing sugars are determined before and after fermentation, enabling reducing dextrins, maltose, and dextrose contents to be calculated. Levulose is determined separately.

Anthrone in concentrated sulphuric acid is suggested as a reagent for sugar in, for example, refinery effluents to replace α-naphthol.[24] The colour produced is measured in an absorptiometer using white light. The effect of the purity of the reagent and time of colour development on the extinction coefficient have been studied.

Preservatives and Flavour

During the late war the use of bromoacetic acid as a preservative in beverages was permitted in France owing to the shortage of sulphur dioxide. This preservative and other halogenated acetic acids can be identified crystographically and microscopically by means of photomicrography.[25]

Difficulties arise in the determination of sulphur dioxide in fish muscle apparently owing to the breakdown of trimethylamine oxide to give rise to formaldehyde. This in turn combines with some of the sulphur dioxide preventing its liberation during distillation (modified Monier-Williams).[26]

Physical methods for ascertaining the purity of vanillin can be applied on a micro scale.[27] Adulterants are detected by micro-melting-point and sublimation experiments. Quantitative determination can be effected by observing, by means of a special technique, the refractive index/temperature relationship in comparison with known mixtures.

The reaction of diacetyl with m-dinitrobenzoic acid has been studied with a view to its use in quantitative estimation.[28] Acetoin and butylene glycol which occur together with diacetyl in substances such as bread are first oxidised to diacetyl.

Miscellaneous Food Products

A new procedure for the determination of cocoa alkaloids is claimed to be rapid and accurate.[29] An aqueous extract is prepared by continuous percolation with hot water in the presence of magnesium oxide. The extract, clarified, is then examined separately for theobromine and caffeine. For the former the alkaloids are absorbed on a column of fuller's earth and the theobromine eluted with N/10 sodium hydroxide solution. Silver nitrate is added at *p*H 6·4 and the liberated nitric acid titrated electrometrically. Caffeine is removed from the clarified aqueous extract at *p*H 1·2 with chloroform and the nitrogen determined by the Kjeldahl method. An improved *Soxhlet* extractor for dissolving cocoa alkaloids has provision for removal of condensed water from the percolate.[30] Caffeine forms distinctive rhombohedral crystals by reaction with iodine/potassium iodide solution in the presence of ammonium sulphate.[31]

Chlorogenic acid has an absorption band at 324 mμ, which can be utilised in determining this constituent of coffee.[32] The absorption of an aqueous extract of the prepared sample is measured before and after precipitation of the chlorogenic acid as its lead salt. An iodometric method is also described.

Metallic Contaminants

The accepted limits set for metallic contaminants have usually been based upon expediency. Such considerations as the amounts which can be detected by known methods of analysis and the degree of freedom from contamination which can be achieved by careful manufacture have, together with a usually meagre knowledge of toxicity, decided the figure to be employed as a limit. A more logical approach would appear to be to decide on medical evidence alone. The possible ill-effects of a poison are so varied, however, that logic must be carefully applied.

Monier-Williams[33] accepts a compromise. Arsenic is regarded as so highly toxic that the ideal limit is complete absence. As this is impossible, he comes back to "what can be achieved under the best conditions of manufacture" as the standard. The present limit of 1·4 parts per million should be retained for most foods. The standard may be relaxed in some cases, *e.g.* sea foods, which are specially liable to take up arsenic in excess of the limit from more or less polluted sea water. The limits for lead should be based upon medical evidence, account being taken of the protective effect of certain foods.

Copper, zinc, and tin are included in a third category for which a moderate degree of contamination cannot be condemned on public health grounds. For these metals the authorities are recommended to continue the present practice of dealing individually with the grosser and more obvious forms of contamination such as zinc in gelatin and copper in tomato products.

Determination of Metals

Allport and Garratt[34] have reviewed the methods available for the determination of traces of metallic contaminants and made recommendations for lead, arsenic, copper, zinc, and tin, all of which follow along accepted lines of procedure. These authors put forward a case for a greater tolerance of metallic contamination of substances which are used in small amounts only. There are difficulties in this. A manufactured article, for instance a curry powder, may consist of many ingredients, each of which is used in a small amount only. Is the tolerance to be extended to the prepared food?

Conditions for the successful colorimetric determination of iron with nitroso R-salt have been investigated and a procedure recommended.[35]

Quality Control

Uses for the polarising microscope[36] and gasometry[37] in quality control have been described. The polarising microscope has found many uses in the examination of foods. The article under review describes some of these and reproduces photomicrographs. Gasometry is the sampling and analysis of gases dissolved or occluded in, or occupying the headspace of, processed foods.

High-speed pipettes of ingenious design for liquids of various kinds (non-volatile, volatile, and corrosive), developed by Ridyard[38] (Cereals Research Station) for rapid routine analysis, have an accuracy comparing well with the normal type in which the level is adjusted by eye. They should find increasing application where time is of importance.

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Cartons and Colour

CARTONS and colour were the subjects of two papers read at a packaging conference held in June at the Park Lane Hotel.

Dealing with the physical angle, Mr. J. R. Foyle, joint managing director of Boxfoldia, said that the carton should comply with four people's requirements. The carton manufacturer required a pack that could be made from material easily available without recourse to various hand operations. He needed information on the contents of the package and how it would be handled. The product packer had to have regard to cost, construction with a view to storage, ease of erection and filling, strength, and other special characteristics. He also wanted a carton that would identify the goods and explain the product, while the distributor required an acceptable pack which saved time otherwise spent in measuring, showed stock at a glance, provided information on the contents, and decorated his store. Requirements for the consumer included a standard quantity and quality, a description of contents, convenience of dispensing, and possible domestic use when empty.

The ingredients of a carton were, he said, dimensions, fastening or construction, material, and printed design, and he described the various methods and materials available and their suitability for different products.

Mr. Foyle concluded by saying that he did not believe a good package could sell a bad article, but it had been proved that a product properly expressed by its package sold better than one that was not.

The difficulties of the designer with regard to the question of colour were dealt with by Mr. Robert F. Wilson, art director of the British Colour Council. It was necessary, he said, to have a really sound knowledge of colour; colour terminology differed in nearly every district, and the Colour Council had therefore compiled a dictionary of colour standards.

Explaining colour systems, Mr. Wilson mentioned various points of importance when choosing package colours. There was the question of areas of colour, how much colour to use, and which colour was most attractive; a few colours could produce the same effect as a large range provided attention was paid to the juxtaposition of the colours. There was also, he said, the question of the arrangement of packs. If a pack had the wrong kind of background, the whole effect would be spoiled. The attractive colouring of a pack could be completely ruined by the effect of lighting, and Mr. Wilson spoke of an instrument he had invented which allowed different coloured papers to be seen under different lights at the same time, thus enabling designers to stipulate the type of lighting required for a particular package.

An exhibition of "Cartons from Abroad" was held at the Conference.

Quick Freezing in Lincolnshire

Years of experience in the freezing of fish fillets have brought about a new era of fruit freezing at Cleethorpes. In the Frigidfruits plant fruits and vegetables are conveyed continuously through the usual processes of grading, blanching, and inspection operations into the freezer, from which they cascade as individual units on to a belt conveyor for the final operations of packing, weighing, sealing, and transport to cold storage.

AN associated company of Frigidfish of Grimsby, who started chilling fish twenty-seven years ago, Frigidfruits have behind them long experience of processing technique. Furthermore, several executives of the firm have studied quick freezing methods in America and Europe.

Considerable care is taken to procure the variety of fruit most suitable for freezing, only the best quality of each variety being picked in the orchards and fields for conveyance to the factory by insulated vans within a few hours of picking. On arrival at the factory the fruit is fed to the appropriate machine for hulling or picking. A high degree of mechanisation is the rule, except in the case of certain fruits for the hulling and inspection of which by hand there is no satisfactory substitute. Machinery is installed for topping and tailing gooseberries, for stemming currants, cherries, plums, and greengages, for peeling and coring apples, for slicing beans and rhubarb, and for cutting vegetables.

Above: **Strawberries are hulled and passed on to the conveyor belt for inspection prior to washing.**

Centre: **After inspection the fruit is passed through a sterilised water spray and thence, by conveyor, to the quick freezing plant.**

Below: **The discharge end of the spray freezer. The individuality of the fruit will be noted.**

Food Manufacture

Processing of Peas

The company have three vans in constant operation for transporting locally grown peas, one loading, one on the road, and one unloading. Peas are not harvested on the vine, but picked in pods and packed in 40 lb. bags.

A podding machine, with a capacity of 4 tons per hour, deals with deliveries as fast as they arrive. Peas are tipped from the bags into a hopper at one end of the podding machine. This consists of two revolving drums and a series of flails operating on somewhat the same principle as a threshing machine. The peas pass through the wire mesh of the outer drum on to a chute, which is a wide belt with a continuously upward movement, and then fall down in an opposite direction to the travel of the chute, but any odd fragments of pod or stalk or leaf move with the belt and are swept away by brushes at the top.

The peas pass on to a belt by means of which they are led *en route* to a bucket elevator, whence they travel by chute to a machine which combines the operations of grading, steam blanching, and spraying with ice-cold water. Following this operation, they travel on by a ledge-fitted conveyor belt to the freezer.

The time taken from delivery into the podder until entry into the freezer is ten to twelve minutes; the freezing operation takes about fourteeen minutes, from freezer to packing a further two or three minutes, and the products are then conveyed to the cold store. At no stage in the operation are the peas touched by hand after being fed into the podding machine.

Quick Frozen Strawberries

All strawberry supplies come from Kent, transported by insulated vans and reaching the freezing plant the same day as they are picked. The fruit is despatched in small baskets to obviate risk of crushing, and also to simplify handing out to the operators for hulling. After inspection they are washed in ice-cold water, air-dried, and passed to a ledge-fitted conveyor belt for transfer to the freezer. Strawberries which do not come up to standard on inspection are used for frozen *purées* or concentrated juice.

Hulling, washing, drying, and freezing takes twenty minutes. The subsequent passage of the fruit by means of conveyors through the weighing, automatic carton heat sealing, and transparent

Above: **Peas from the podder, which is capable of handling four to five tons per hour, are conveyed to the grader.**

Centre: **After grading, the peas are conveyed to the steam blanchers.**

Below: **After blanching and spraying with ice-cold water, the peas are conveyed by belt to the freezer.**

Retail cartons are check weighed and then conveyed to the automatic carton sealing machine.

film wrapping machines into the cold store, and packing into outers, takes another three to four minutes. All fruit and vegetables remain untouched by hand after inspection, the operations being carried out automatically by a series of connected conveyor belts. Machines for hulling all fruits, other than strawberries, raspberries, and loganberries, are installed.

The Freezing Process

The product to be frozen passes down a wide chute on to a segmented belt of closely woven wire. At this stage a fan is sometimes used to drive off the products by air pressure. This belt carries the product slowly through the freezer and under a cascade of invert sugar syrup which has been brought down to a low temperature by direct contact with ammonia coils. The product emerges from the freezer with a transparent coating, each item being individually frozen. This obviates the need for the use of syrup in the packing of soft fruits, and means that the contents of the pack are all fruit and not so much syrup and so much fruit. The quick freezing operation is completed in fourteen minutes.

The new type automatic machine bends in the side tucks, folds over the top, heat seals the fold, cools the seal, and flattens out the top.

There is a water content in all fruit, and any leaching of this would tend to thin down the syrup which would result in its freezing to the coils, and would also mean that some packages of fruit had a stronger syrup solution than others. To overcome this, the syrup, after passage through the fruit, is pumped into a concentrator which dries off all the water content and thus restores the syrup to its original strength for recirculation.

The invert solution is brought to the factory in tankers and filled into storage tanks. After use

for one product, it is drawn off from the freezer and sterilised, and thus rendered fit for use on other products.

From the freezer the products cascade on to a wire conveyor belt, whence they are transferred to a rubber conveyor belt, on either side of which are seated five girls who scoop off the fruit into short chutes into the cartons. The cartons are stored on a mezzanine floor above and are fed into square ducts through which they travel by air pressure; from thence they pass down an enclosed chute, at the bottom of which they emerge on to a conveyor belt running parallel with and at a higher level than the belt on which the product is travelling.

Cartons are automatically wrapped at the rate of 70 per minute.

Filling and Packaging

From the freezer room the product travels on one belt if it is destined for the caterers' pack, and on another if for the consumer pack. The latter is a new type having a fold-over, heat-sealed top. After the packs have been filled they pass to a machine which bends in the side tucks, folds over the top, heat-seals the fold, cools the seal, and flattens out the top. From this point they are conveyed by belt to a completely automatic wrapping machine capable of wrapping seventy cartons per minute in transparent film.

After packaging, the cartons pass by conveyor to a low temperature cold store for transitional storage pending despatch to the main cold store or distribution to depots. The cartons are packed in 48's in fibreboard cases, which are then strengthened and fastened by tensional steel strapping. The same principle applies to the caterers' cartons, which are packed four to the case.

Cartons are conveyed to the cold room and packed into outers prior to despatch to depots.

SUPPLIERS OF EQUIPMENT

Blanchers, grader, sprayers, conveyor belts, sterilising equipment: *Frigidfruits, Ltd.*

Freezer and concentrator: *Food Installations, Ltd.* (also consultants to the company).

Podder: *Mather and Platt, Ltd.*

Hulling machines: *Wm. Brierley, Collier and Hartley, Ltd.*

Automatic wrapping machine: *Rose Bros. (Gainsborough), Ltd.*

Automatic carton sealing machine: *Supreme Tools, Ltd.*

Cartons: *Satona, Ltd.*

Containers: *New Merton Board Mills, Ltd.*

Weighing machines: *W. and T. Avery, Ltd.*

Insulated vans: *Bratleys, Ltd.*

Ministry of Food

Latest Statutory Instruments

The list given below is the continuation of the list of Orders published in ***Food Manufacture***, September 1, 1949, page 406.

No.	*Date.* 1949.	
		PRICE FIXATION
1388	Aug 1.	Order amending the Feedingstuffs (Prices) Order, 1949.
1512	„ 14.	Order amending the Biscuits (Maximum Retail Prices) Order, 1943.
1513	„ 14.	Order amending the Dried Fruits (Control and Maximum Prices) Order, 1948.
1515	„ 16.	Order revoking the Tapioca and Sago (Maximum Prices) Order, 1947.
1527	„ 14.	Order amending the Imported Canned Fish (Maximum Prices) Order, 1947.
1549	„ 21.	Order amending the Cereal Breakfast Foods (Control and Maximum Prices) Order, 1947.
1657	„ 11.	The Meat (Maximum Retail Prices) (General Licence) Order, 1949.
1682	Sept. 11.	Order amending the Egg Products (Control and Maximum Prices) Order, 1946.
1685	„ 11.	Order amending the Imported Canned Fish (Maximum Prices) Order, 1947. Revokes S.I. 1948, No. 1042; S.I 1949, No. 1527.
1778	„ 25.	Order amending the Bread (Control and Maximum Prices) Order, 1947.
1721	Nov. 6.	Order amending the Cheese (Control and Maximum Prices) Order, 1948.
		CANNED FRUIT
1726	Sept. 18.	Order amending the Canned Fruit and Vegetables (No. 2) Order, 1946.
		CANNED VEGETABLES
1726	Sept. 18.	Order amending the Canned Fruit and Vegetables (No. 2) Order, 1946.
		EGGS
1377	July 25.	Order amending the Eggs (Great Britain) Order, 1949 and the Eggs (Northern Ireland) Order, 1949.
1748	Sept. 22.	Order amending the Eggs (Great Britain) Order, 1949.
1749	„ 22.	Order amending the Eggs (Northern Ireland) Order, 1949.
		FEEDINGSTUFFS
1583	Sept. 1.	Order amending the Feedingstuffs (Licensing and Control) Order, 1943.
		FRUIT
1415	Aug. 1.	Order revoking the Home-grown Apples (No. 2) Order, 1948.
		GRAINS
1162	July 1.	Order amending the Oats (Control and Prices) (Great Britain) Order, 1948.
1163	„ 1.	Order amending the Oats (Control and Prices) (Northern Ireland) Order, 1948.
1164	„ 1.	The Wheat (Great Britain) Order, 1949. Revokes S.R. & O. 1947, Nos. 1535 and 1882; S.I. 1948, Nos. 619 and 1761.
1165	„ 1.	The Wheat (Northern Ireland) Order, 1949. Revokes S.R. & O. 1947, Nos. 1536 and 1882; S.I. 1948, No. 1764.
1166	„ 1.	Order amending the Home-grown Beans and Threshed Feeding Peas (Sack Charges) Order, 1948.
1185	„ 1.	The Barley (Great Britain) Order, 1949. Revokes S.R. & O. 1947, Nos. 1636 and 1887; S.I. 1948, Nos. 619 and 1759; 1949, No. 502.
1186	„ 1.	The Barley (Northern Ireland) Order, 1949. Revokes S.R. & O. 1947, Nos. 1637 and 1887; S.I. 1948, No. 1762; 1949, No. 502.
1191	„ 1.	The Dredge Corn (Great Britain) Order, 1949. Revokes S.R. & O. 1947, Nos. 1638, 1888, and 2772; S.I. 1948, Nos. 619 and 1745; 1949, No. 503.
1192	„ 1.	The Rye (Great Britain) Order, 1949. Revokes S.R. & O. 1947, Nos. 1538 and 1889; S.I. 1948, No. 1747.
1199	„ 1.	The Rye (Northern Ireland) Order, 1949. Revokes S.R. & O. 1947, Nos. 1539 and 1889; S.I. 1948, No. 1747.
1200	„ 1.	The Dredge Corn (Northern Ireland) Order, 1949. Revokes S.R. & O. 1947, Nos. 1639, 1888, and 2772; S.I. 1948, No. 1749; 1949, No. 503.
		SOAP
1255	July 10.	Order amending the Soap (Licensing of Manufacturers and Rationing) Order, 1949.
		SHREDDED SUET
1497	Aug. 7.	The Shredded Suet Order, 1949.
		VEGETABLES
1264	July 10.	Order revoking the Carrots (General Provisions) Order, 1944 and the Carrots (1948 Crop) (No. 2) Order, 1948.

The Veterinarian and Meat Production

The veterinarian's place in the breeding and nutrition of, and in the prevention of disease in domestic animals, and the production and distribution of meat was discussed by C. S. M. Hopkirk, D.V.S., M.R.C.V.S., at the XIVth International Veterinary Congress.

BY virtue of his training the veterinarian can legitimately claim interest in the breeding and nutrition of, and the prevention of disease in domestic animals, and the production and distribution of their meat.

He alone is competent to speak on all four aspects and to work with other specialists in any one of these groups. Never has there been a time in world history when the veterinary profession could, through its association with optimum animal production, contribute so much to the welfare of mankind.

Nor does the veterinarian work alone; he takes his place in all agricultural teams, having the assistance of, and in turn assisting, all agricultural scientists in the one great problem of increased production of food for a world so depleted. Depletion brought about by war, drought, soil erosion, and by unintelligent farming methods has, over the more recent years, reduced numbers of domestic animals to be used for milk, meat, and wool to an alarming extent.

Dr. C. S. M. Hopkirk, D.V.S., M.R.C.V.S., of New Zealand.

Movement of armies in Europe had reduced stock over all Eastern Europe to a point when recovery could only be brought about by shipping many thousands of heads of stock from the west. This was done under the United Nations Rehabilitation Scheme, which purchased stock for devastated countries from those with animals to spare. These animals, in many cases, came long distances by sea under all sorts of weather conditions; they had to be free from known diseases, required skilled attention during travel, and finally had to be carefully placed in new countries whose life blood they then became.

Decline in Breeding Stocks

Fowl pest and swine fever have, on many occasions, reduced livestock in certain areas of the world, while deficiencies of cobalt, copper, phosphorus, and calcium prevented breeding of stock in enormous tracts of land. Unintelligent farming by overstocking of natural or sown pastures, and haphazard clearing of bush land in new countries causing tragic erosion, have been even more instrumental than war in reducing the number of animals carried in many countries, and these, in addition to the drought factor, have led to a great decline in breeding stocks of cattle and sheep, and, secondarily, to pigs and poultry.

As well as the decline in numbers of stock, there is the other side of the picture—the increase in population with the right to live on a higher plane of nutrition than was considered necessary a generation ago.

Each country, each people, each climate, and each age has bred animals which have suited their temporary needs. In backward areas before the present mechanised age, many animals had to be of dual and treble purpose—milk, draft, and meat in the case of cattle, and milk, wool, and meat in the case of sheep. Even in this age, what machinery could take the place of the water buffalo of the rice fields of China, or, without farmers' co-operative ownership, could till the small fields of much of Europe? But with the increase in machinery, it seems likely that many dual purpose breeds of animals may disappear and give place to the single purpose animal.

Selection within breeds is already paying dividends, as can be seen in the hump-backed native cattle of Kenya, the Merino of Australia, or (experimentally) the milk-producing buffalo in Italy, and this applies even more in the long known and relatively high producing breeds of cattle, pigs, and sheep of Europe. Many of these European types, taken from their native land and placed far overseas in the United States, Argentina, Australia, or New Zealand, have changed to an almost unrecognisable degree under new feeding and climatic conditions—the Jersey cow, Polled Angus cattle and the Romney sheep in New Zealand, the Merino in Australia, and the Guernsey and Brown Swiss in America. This improvement overseas has led to steady improvement in the countries of origin in order to keep abreast of lusty competition.

A view of a modern abattoir, looking down the slaughter floor from the cooling room. The weighing room is on the left, offal rooms on the right.

Breed Societies who depend on appearance of their animals for continuation of the breed rather than on their performance in production for mankind are doing a great disservice. Horns in many cattle breeds should definitely be discouraged, for there is no greater harm done in the meat trade than the damage by horns in trucking and yarding meat animals, while there is every reason to believe that hornlessness leads to docility and greater fattening propensities. Protection of domestic cattle in these days is no longer left to the animal itself but to the owner.

Artificial Insemination

With the introduction of artificial insemination, a great instrument for perfection or deterioration of breeding has been placed in our hands. Its main aim at present in European countries, unfortunately, is to prevent disease, and this must come first, but its greatest advantage lies in the use of superlative semen carrying the factors required for production, whether of butter, fat, wool, or meat.

Viewed from the nutritional angle, breeding and production of stock on suitable areas have been chiefly inhibited by mineral deficiencies. They were first brought to our notice in South Africa when phosphate was found to be so necessary, and where its lack was found to interfere seriously in breeding and in growth, and to precipitate so many secondary disease conditions. Their further role was studied in the United States of America, Australia, and New Zealand, when deficiencies of cobalt and copper were shown to impair animal production and breeding, and even life, over huge areas of land.

In New Zealand thousands of acres of virgin country which would not bear stock have been turned into fertile land giving increasing yields of flesh and milk at a time when they are most needed. This is a veterinary triumph. There must be great areas of Europe, Asia, and South America which will be found deficient and which will respond to top dressings of various minerals to improve livestock. Even Great Britain has found this to be so in recent years.

The veterinarian must hold full responsibility for control of disease in all types of domestic animals. There should be no shelving of responsibility to Medical Health Authorities. Sanitary inspection, particularly of meat and milk, is essentially the work of the trained and qualified veterinary inspector. It is his right to control epizootics of major and minor types, to centralise quarantine affairs, and to advise the breeder how best to prevent disease occurring in his livestock. It must be granted that there are diseases of animals such as tuberculosis, Bang's disease, types of mastitis, salmonella infection, and so forth which interest Public Health Medical Authorities because of a possible transfer to human beings, but the right to control these on the farm and hand the product in a healthy state to Public Health Authorities at the farm gate is that of the veterinary surgeon.

Necessity for Up-to-date Abattoirs

Abattoirs or large slaughterhouses should first of all be up to date. Economic slaughtering cannot be carried out in small abattoirs which serve one function only—that of killing a beast or a few sheep or pigs for local consumption. The insanitary conditions and the loss involved in slaughtering on this small scale is appalling. The solution is to see that every country sets up municipal abattoirs for centralisation of slaughter with efficient transport of live and dead meats. The result would be greater cleanliness, better inspection, and economic utilisation of offal.

The importance of meat inspection scarcely needs stressing; it is usually the duty of a layman under veterinary supervision. With the present meat shortage the inspector can show a leniency in condemnation which would not be countenanced in

time of plenty. He must do this with due regard to human health, saving a quarter here and another there, when the easiest course would be to condemn the whole carcass. His is the responsibility for obtaining every pound of meat the carcass will give.

It is the custom in many countries to have laboratories attached to the larger slaughterhouses, and this is to be strongly commended, for biochemical and bacteriological tests are important in those countries where a dead animal is salvaged.

It may be claimed that refrigeration does not come under veterinary control; that is largely true, but if pre-cooling and refrigeration have not been perfect, then it is to the veterinarian that food authorities should turn to adjudicate on spoilage and salvage.

Taste Differences in Individuals

VERY recently an attempt has been made by H. Harris and H. Kalmus of University College, London, to throw new light on taste differences in individuals.*

In a communication to *Nature* (**163,** 878-79, June 4, 1949) Harris and Kalmus, after reviewing briefly the already published work on the subject of taste blindness to phenylthiourea and related substances, report that they have recently developed a method of measuring taste thresholds, the method depending on a determination of the lowest concentration of a solution of a sapid substance which the subject can distinguish from water. Using this method they have confirmed that there is a high correlation between taste sensitivity for phenylthiourea, *sym*-diphenylthiourea, thiourea, thioglyoxaline, and thiouracil; that is to say that individuals who can taste one member of this group can also taste the others, and similarly those individuals who find one member of this group of substances tasteless, for the most part cannot taste the other members of the group.

Substances also tested included urea, phenylurea, and uracil, and the ability to taste these substances bore no relation to the ability or inability of the individuals to taste the members of the former group. The substances to which the distinct types of individuals respond differently are, as C. Y. Hopkins (*Can. J. Research,* **20**B, 268-73, 1942) pointed out, characterised by the possession of the $=N-C-$ (with S) group. So far, so good. Harris and Kalmus confirm what was known and extend the knowledge a little by consideration of one or two new substances.

But now they introduce quite a new feature, and one of very great interest. They point out that the $=N-C-$ (with S) group is also characteristic of a group of substances which possess anti-thyroid properties, some of which, such as thiouracil, methylthiouracil, and propylthiouracil, are now commonly used in the treatment of thyrotoxicosis. E. B. Astwood, A. Bissell, and A. M. Hughes (*Endocrinology,* **37,** 456, 1945) found that a large number of substances that exhibited anti-thyroid activity were also characterised by the presence of the $=N-C-$ (with S) group, and one of these substances was 2-mercapto-5,5, dimethyl oxazoline, which Hopkins has shown possesses dual taste properties.

The position is, therefore, that some individuals cannot taste substances which depress thyroid activity. Is it possible that these non-tasters are people whom a thyroid depressant would not harm, *i.e.* hyperthyroid individuals? If so, they might never dislike the taste of cabbage, which contains isothiocyanates and which depresses thyroid activity. In fact, as Harris and Kalmus point out, it was shown by A. M. Chesney, T. A. Clawson, and B. Webster (*Bull. John Hopkins Hosp.,* **43,** 261, 1928) that rabbits which were fed exclusively on cabbage developed goitre, and their metabolic rate fell. Does this, too, afford an explanation of the marked dislike that some individuals exhibit for cabbage? Possibly they are those individuals whose thyroid activity is a little on the low side.

In the words of Harris and Kalmus: "Differences in taste sensitivity may reflect metabolic differences between individuals with respect to these substances."

Taste blindness is known to be hereditary, and the genetical aspects of the subject are also discussed by Harris and Kalmus.

The suggestions are admittedly speculative, but they do seem to offer some chance of affording a reasonable explanation of the strange and hitherto unexplained fact that a proportion of individuals cannot taste certain substances such as phenylthiourea, which to the majority of people are strongly bitter. It is important to note that the non-tasters of phenylthiourea, etc., can taste, in the normal way, other bitter substances such as quinine; their defect is not a general deficiency of the bitter taste sensation, but is specific to those substances containing a $=N-C-$ (with S) group.

It begins to appear that this taste blindness is part of a balanced design of Nature, not unconnected with the rate of metabolism. It is true that the individuals would not, in Nature, be expected to encounter phenylthiourea in any high concentration, but they might well encounter in cabbage, etc., substances which also contained a $=N-C-$ (with S) grouping.—R. W. M.

* An article on this subject appeared in the June, 1949, issue of FOOD MANUFACTURE.

New Uses for Milk By-products

THE second and more technical half of a recent FAO publication* is devoted to various ways in which skim milk and whey can be more efficiently used in human nutrition. In the larger milk producing countries of the world, skim milk is still heavily fed to animals and a high proportion of the world's annual production of whey in cheese-making is discarded. Skim milk is a valuable food, high in protein, vitamins, minerals, and sugars; whey, though less valuable, contains half the original milk solids, and that portion contains much more than 50 per cent. of some of the important minerals and riboflavin.

It is pointed out that one of the most important outlets for skim milk is the baking industry. Experimental work in this direction in Norway (1921) and Britain (1928 and 1932) is discussed, but some American developments in 1947 promoted by the American Dry Milk Institute will probably be of greater interest to bakers. The addition of 6 parts by weight of dried skim milk to 100 parts of flour increases loaf weight proportionately, but increases loaf size by 12 to 15 per cent.; and improves the texture, flavour, colour, and keeping qualities of the bread. Furthermore, the protein content of the mixed flour and dried skim milk is 20 per cent. above that of the flour, and the mineral content is doubled. Since the extra protein is animal protein, this addition to flour's vegetable protein is of greater nutritional value than these figures indicate. Another special advantage of this kind is that the riboflavin from the dried skim milk assists in the better assimilation of calcium.

The use of dried skim milk by the American baking industry is now being practised on a substantial scale, and in the words of the survey these U.S. developments indicate the enormous possibilities of the bakery industry in other countries as an outlet for this product. Dried skim milk is also being used in prepared flours, and it competes with condensed or fresh milk in confectionery manufacture. Some 1948 work is quoted showing that up to 10 per cent. of dried skim milk can improve the nutritional value and flavour of sausages.

Developing whey as an ingredient for food products is a more difficult task. It is shown, however, that the keeping quality of bread is improved more by whey than by skim milk additions. In the United States, however, more use has been made of dried whey in the cake and confectionery industries than in bread manufacture. Condensed and even ordinary whey has been successfully used in fudge and caramel production. Both whey and skim milk have been used in soup manufacture, and have been specially successful in spray-dried soup mixtures. Dried whey has been recommended as an emulsifying agent in salad creams.

Another American development on rather different lines is the extraction of riboflavin from whey; and even a vinegar has been produced by fermenting its high lactose content. One of the conclusions reached in this FAO publication is that it is essential to educate the food manufacturer that, under certain conditions of handling, whey is a convenient and advantageous item of produce.

Food manufacturers in areas where substantial volumes of whey are produced might well find it profitable to initiate discussions with the neighbouring dairy factories with a view to utilising this sometimes neglected by-product.—D. P. H.

* *Better Utilisation of Milk*. FAO Agricultural Study No. 7. 1949. Pp. 76. H.M.S.O. Price 4s. 2d. post free.

Canadian Market for Jellies

THE following information on the market in Canada for table jellies has been provided by the United Kingdom Trade Commissioner at Montreal:

The normal English type of table jelly, a block of concentrated gelatine containing strained fruit juice or, in the cheaper varieties, synthetic colouring and flavouring matter, is not likely to achieve any sale in Canada. The place of this type of jelly has been taken by the jelly powder or gelatine dessert, its Canadian name, which is easier to prepare.

The supply of all brands of domestic manufacture is now adequate to meet the demand. Canadian manufacturers undertake extensive trade paper, newspaper, radio, window, and counter display advertising to maintain the volume of their sales.

Gelatine desserts are made by a dozen or so Canadian firms and are sold in grocery, chain, and general stores. The two most popular brands are the most expensive, and have the reputation of being the best in quality and are also the most widely advertised. Both brands have recently raised their prices from 25 cents for three 2½ oz. packages to 17 cents for two packages or 10 cents per package. Artificially flavoured and coloured products retail at prices ranging from 5 cents for two 3 oz. or 2½ oz. packages to 5 cents per package.

The following assumptions may be made from the various factors mentioned above:

(*a*) Gelatine desserts will not sell if their retail prices are higher (for the types flavoured with fruit juice) than 10 cents for a 2½ oz. package or 5 cents for a 3 oz. package in the case of artificially coloured and flavoured jellies.

(*b*) Price for price, jellies sell on a "name" first, and known flavour and preparation performance second.

(*c*) The "name" can only be made popular and its popularity can only be retained by extensive and consistent advertising campaigns.

The creation of a "name" is a lengthy and expensive process, but there is a market for United Kingdom products, subject to strong Canadian competition, provided that manufacturers are able and willing to spend a considerable sum of money on advertising.

The Nutritive Value of Butterfat

Before the fortification of margarine with vitamins was made compulsory in Great Britain butter was rightly considered as outstanding in nutritive value among the animal and vegetable fats commonly consumed at the table, as distinct from fish liver oils used mainly as medicines. This pre-eminence was challenged by the introduction of vitamins A and D into margarine, and while to discerning tastes butter may still retain its superiority in flavour and texture there is now no clear evidence that it is more nourishing than margarine. From time to time, however, various investigators have suggested that butter may have nutritional virtues unrelated to its vitamin content. These claims may now be reviewed in the light of additional evidence recently obtained by Indian investigators, as reported to the Nutrition Society by R. Chanda. In his own experiments this worker has found that ghee, a form of melted butterfat, is superior to highly hardened vegetable oils in promoting the absorption of calcium and phosphorus.

TO those who are not versed in the complex economics of the dairy trade the survival of butter as an ordinary commercial commodity may seem difficult to understand. If we assume that high quality milk contains a round figure of 4 per cent. of fat, and that it costs 5d. per pint retail, it may be calculated that to make 1 lb. of butter an amount of milk valued at no less than 8s. 4d. must be used. Thus, at first sight, a loss of nearly 6s. on each pound might be implied, which would give ample grounds for the cynicism that at its proper economic price only wealthy margarine manufacturers could afford to buy butter.

In actual practice, however, factors such as the cost of distribution of fresh milk, the need to dispose of milk beyond the consumptive capacity of local populations, the value of skimmed milk in the farm and factory, and the operation of subsidies have all to be considered. Butter therefore remains a source of profit to districts producing milk greatly in excess of the needs of their population. The practice in countries with a low ratio of cows to human beings, however, should inevitably tend, both for nutritional and for economic reasons, towards a maximum consumption of fresh milk.

Butter or Margarine

Since the economic basis of butter production is so closely interrelated with the other aspects of the dairy industry, it is not surprising that in many parts of the world agricultural interests should regard the manufacture of margarine as a threat to their prosperity. In parts of America considerable political pressure has been brought to bear, and the artificial colouring of margarine in the factory to resemble butter has been made illegal. A small packet of yellow dye is therefore included in each package of margarine, with instructions to the consumer as to how it should be mixed in.

Such direct legal action against the advance of margarine sales may perhaps be open to some criticism. No exception can be taken, however, to the repeated efforts by research workers interested in the nutritional aspects of the dairy industry to find in what directions butter and margarine still differ.

Absorbability of Fats

An excellent review of the earlier investigations in this field has been contributed by Dr. J. A. B. Smith, acting Director of the Hannah Dairy Research Institute, to the *British Journal of Nutrition* (1948, vol. 2, page 190). He points out that the important experiments carried out by Langworthy and his colleagues twenty-five years ago demonstrated clearly that all animal and vegetable fats are almost completely absorbed from the human intestines provided they are liquid at body temperature. With melting points above body temperature, however, the absorbability was found to decrease considerably. Thus, with groundnut oil hardened to melt at 37° C., the amount absorbed was 98·1 per cent., but with melting points at 43° C., 50° C., and 53° C., the proportions absorbed were reduced to 96·5 per cent., 92 per cent., and 79 per cent. respectively

Subsequent experiments have confirmed the view that all edible fats are equally well absorbed, provided that their melting points are such that they can liquefy, or at least soften, in the alimentary tract. No superiority of butter over margarine can therefore be claimed on the grounds of absorbability. It also appears unlikely that the acids of low molecular weight, which are present in considerable

amounts in butterfat, have any particular nutritional virtues.

No advantage for butter over margarine can therefore be claimed in regard to either its content of the more familiar vitamins or its absorbability. Suggestions have been made, however, that it is nevertheless distinctly superior to margarine. Thus Jansen and his colleagues in Holland have reported that rats, given a diet containing butterfat, grew more rapidly than others given diets containing vegetable fats. Butterfat, they have pointed out, differs from the vegetable fats, *inter alia*, in containing small amounts of vaccenic acid, a solid isomeride of oleic acid, which has its one unsaturated linkage in the 11:12 position instead of the usual 9:10 position. In some of his experiments Jansen found that vaccenic acid increased the growth of rats even after it had been isolated from butterfat and dissolved in vegetable oil before feeding. In more recent trials, however, more highly purified vaccenic acid gave less consistent evidence of growth promoting power, and the question whether it possesses any special nutritional merit remains open.

Vaccenic Acid

The relationship between oleic and vaccenic acid, which involves a change in the position of the unsaturated linkage away from the middle of the molecule towards the terminal acid groups, recalls an interesting observation made many years ago in Great Britain by S. K. Kon and T. Moore. In studying the effects of seasonal variation in butterfat they found that the spectroscopic absorption spectra of the fatty acid fractions of specimens collected during the summer months showed much higher absorption in the far ultra-violet region than those of specimens collected during winter. The absorption was associated with fatty acids containing two or more unsaturated linkages, but linoleic and linolenic acids prepared from vegetable sources showed much less intense absorption.

Evidence was later obtained that the more highly unsaturated acids of butterfat resemble vaccenic acid in having their unsaturated linkages in unfamiliar positions. The intense spectroscopic absorption may thus readily be explained by the occurrence of conjugation, with the arrangement of the unsaturated linkages between alternate pairs of carbon atoms. There is no evidence, however, that these unusual acids have any superiority over their unconjugated forms in regard to nutritive value.

Butter Flavour

Although American workers at one time claimed that butterfat is far superior to vegetable fats in supporting growth in young rats giving a basal diet with lactose as the sole carbohydrate component, subsequent investigations have failed to support this view. In Germany carefully controlled experiments have indicated that margarine is in no way inferior to butter as a source of fat for growing children, although, for psychological reasons, margarine which was dyed yellow was much preferred to the same foodstuff without artificial colouring.

In its flavour, however, butter certainly has a useful function in stimulating appetite, and common human experience on this point has been amply confirmed in experiments with rats. In margarine the natural taste and aroma of butter may be successfully stimulated by the addition of diacetyl. Although the tastes of experimental rats for food often differ widely from those of human beings, they have been found to prefer a diet flavoured with diacetyl to an unflavoured diet.

Butter Substitutes in India

On account of the shortage of butterfat in India, the consumption of hydrogenated oils, known locally as *vanaspatis*, has recently been greatly increased. Experiments reported by R. Chanda, in which the nutritive properties of *vanaspatis* were compared with those of ghee, are therefore of interest in transferring the problem from a western to an eastern setting. It might well be considered that with large sections of the Indian population habitually subsisting on diets far below western standards the necessity of fortifying *vanaspatis* with vitamins would be emphasised, while any slight superiority of butter over hydrogenated fat in other directions would have increased significance.

In support of this view, Ray and Pal found that when they gave various fats to rats in conjunction with a liberal basal ration of maize, wheat, casein, yeast, and minerals, with daily supplements of skimmed milk and green vegetables, their results confirmed those of western workers. Thus the rates of growth which they observed in animals given butterfat were no greater than when the fat component of the diet was supplied as *vanaspati*. When, however, the fats were added to a less adequate basal diet, in which the main constituents were freed from fat by extraction, and in which the fat-soluble vitamins were supplied at sub-optimal levels, definite evidence for the superiority of butterfat was obtained. While no differences in growth rate were found in rats kept on the diets for a single generation, the animals of the second or third generation which received butterfat grew more rapidly than those which received *vanaspati*. Presumably the absence of this effect in the final generation was due to the considerable reserves of vitamin A which the rats possessed when they were first taken over from the stock colony for use in experiments. With ghee the absorption of carotene was found to be 15 per cent. to 20 per cent. higher than with *vanaspati*, but the effect of this superiority was not apparent until the original reserves of vitamin A were dissipated.

In experiments by Chanda the effects of various dietary fats on the metabolism of calcium and phos-

phorus were investigated by adding them to an otherwise fat-free diet. The components used were casein, which had been extracted with alcohol and light petroleum, yeast extracted with alcohol and light petroleum, dextrinised starch, and minerals. Vitamin A was supplied as 5 micrograms of carotene daily and vitamin D as 1 microgram of calciferol daily. When ghee was to be tested these allowances were reduced by amounts equal to those present in the ghee.

Calcium and Phosphorus Absorption

The fats tested included butterfat or ghee, crude and refined groundnut, sesame and cottonseed oils, and various hydrogenated forms of these oils with melting points ranging from 36° C. to 43° C. In a typical experiment, female rats in an early stage of pregnancy were removed to a dark room, so that the influence of illumination on calcification could be ruled out. After birth the young rats remained in the same room, and from weaning onwards received the fat free diet supplemented with the various fats at a 5 per cent. level. Collections of excreta were made over suitable periods, and calcium and phosphorus were estimated.

When appropriate allowances were made for differences in the food consumptions in the various groups it was found that the absorption of calcium was not significantly lower with refined vegetable oils and with low melting *vanaspatis* than with ghee. With *vanaspatis* of high melting point, however, and with crude cottonseed oil containing the toxic agent gossypol, the absorption of calcium was significantly decreased. The absorption of phosphorus was not significantly different with ghee and with the refined unhardened vegetable oils, but was inferior with crude cottonseed oil and with all the *vanaspatis* tested with the exception of one specimen with a melting point of only 36° C.

Conclusions

The ability of fats to influence the absorption of calcium in a manner unrelated to their vitamin D content is no new conception, having been reported in 1933 by Booth and Kon. The results of Chanda's painstaking experiments, however, are of interest in showing that the relative effects of different fats may be greatly influenced by their composition, and particularly by their melting points. While, however, there is now interesting evidence that unduly hardened fats may be less effective than softer fats in aiding the absorption of minerals, it would be unjustifiable to assume a similar difference between butterfat and good quality margarine. It is not yet clear whether the inferior absorption of carotene observed by Ray and Pal when *vanaspati* was substituted for ghee applies to all specimens of *vanaspati*, or only to those with a high melting point.

Since butter and margarine are among the most important of our staple foodstuffs, it is highly desirable that continuous efforts should be made to amplify our knowledge of their nutritional value and significance. Investigations which show even minor differences or similarities should not therefore be overlooked. As far as can be judged from the facts already at our disposal, however, it would appear that when differences in their contents of vitamins A and D have been adjusted the main disparity between the two foodstuffs is only a matter of flavour. In spite of the wide diversity of their origins they seem to be closely similar in nutritive value.

Waste or Conservation?

"THE Chinese principle of returning all organic refuse to the soil is, indubitably, sound. The Chinese details may be unhygienic and subject to improvement. In our Western civilisation the details of our domestic sanitation are refined, hygienic, and almost ingenious; but the principles behind these details are irrefutably rotten and criminal."

This forthright quotation from a new book* by a South African expert on sewage and town refuse reclamation summarises one of civilisation's major technical problems of the future. People are increasing, soil acreages are not; food demands are rising, but the organic contents of the top ten inches of the earth's crust are tending to decline.

Modern water-borne sanitation methods have made a great contribution to public health, but there is also a debit side to their budget, for great quantities of material that should return to the soil are dump-buried or burnt or carried away by rivers into the seas. As a realistic study of reclamation methods, based upon the author's own experiences since 1939 in the Union of South Africa, this book deserves widespread attention.

One particular section—an appendix contributed by G. C. Dymond, A.R.I.C.—should be studied by those in the cane sugar industry. It deals with the reclamation of sugar wastes.

The conversion of the cane tops into silage is strenuously urged, and the greater attention paid by the beet sugar industry to converting beet tops into fodder is emphasised. It is also pointed out that cane tops could be fermented into a better rum than is obtained from molasses. The waste trash composts slowly, but if mixed with more active materials such as bagasse, used filter cake, and residues from fermentation of molasses and tops, satisfactory compost can be produced in large heaps aerated by compressed air. For example, the sugar wastes of Natal could be converted into 2½ million tons of compost the value of which, at a conservative estimate, would be £2,500,000.—D. P. H.

* *Soil Fertility and Sewage.* By J. P. J. van Vuren. Pp. 236. 24 ill. Faber and Faber, London. 1949. Price 18s. net.

Modern Chocolate Refiners

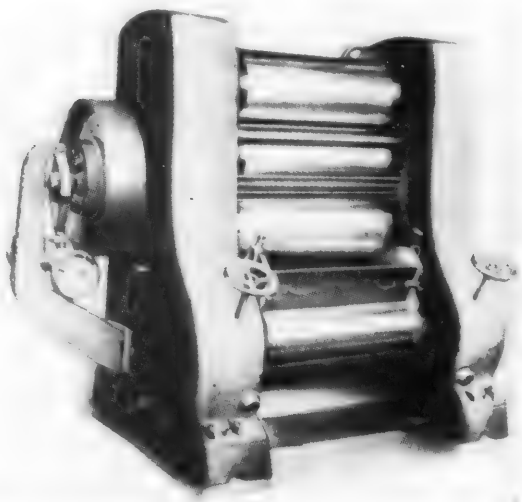
H. K. WIEMER

Since the time when, fifteen years ago, the author began to develop the five roller refiner which has become known as the 912, chocolate refiners have undergone appreciable changes in design. During this period, about 1,500 refiners of this type have been built, including modified versions. The construction of so many machines afforded an opportunity of contacting practically all the chocolate factories and experts in the world and, in consequence, of accumulating a vast amount of experience, an account of which is detailed in this article.

As the construction of these chocolate refiners was interrupted at the end of the war, it was interesting to learn of the condition of the Refiner 912, and the way in which the various parts had behaved, when a repair service was started for it in England in 1948.

The long time which had elapsed and the traces of wear and tear provided their own answer to such questions as to which constructional parts are suitable and in what respect constructional improvements can be made, and above all they showed clearly where lie the limits of efficiency of the chocolate refiner; what gear ratios are the most advantageous for the various purposes; and which roller material is the best.

All these details were of considerable use in the construction of a new five roller chocolate refiner, which will be known as the 1950 TM. Based on that experience, it will be possible in future so to design this machine in regard to efficiency and differential speeds between the rollers, as to meet the requirements of the different chocolate factories concerned.



The 912 Lehmann five roller refiner.

Many years ago the author had already observed that a five roller refiner with a general gear ratio cannot be used with the same degree of success in all the varying conditions encountered in the manufacture of chocolate, and is therefore convinced that for the gear ratio in a modern, high-speed chocolate refiner it is far more important than ever before to know, for example, the composition of the chocolate which it is intended to treat, and also how large the particles of the mass are when delivered to the machine, and what the size of the particles has to be when the chocolate leaves the machine.

As, in the course of time, thousands of samples of chocolate have been microscopically examined, and the size of their particles measured before and after the refining process, it was decided to equip the machines with different gear ratios. For example, machines were built with gear ratios of 1:5, 1:7, 1:10, 1:13, and 1:19 (calculated from the lower to the upper roller), and selected upper roller speeds of 135, 200, 250, and 300 revolutions per minute according to the particular conditions involved. Machines with a gear ratio of 1:32 and upper roller speeds of 400 r.p.m. were even tried out. Successes and failures were recorded, and through both the road to success was found.

Uniformity of Cooling and Expansion

Although in the first high-speed machines almost insuperable difficulties were encountered in transferring the film of chocolate uniformly from roller to roller, these were ultimately overcome, as the result of hard work, by designing a novel type of roller with uniform cooling and expansion, and by evolving new methods of grinding it. The outstanding success achieved by this new roller when once it had been perfected is well known, since it is now possible to grind the chocolate to a uniform degree of fineness even with a considerably higher machine output.

In addition to the different gear ratios and roller

Fig. 1.

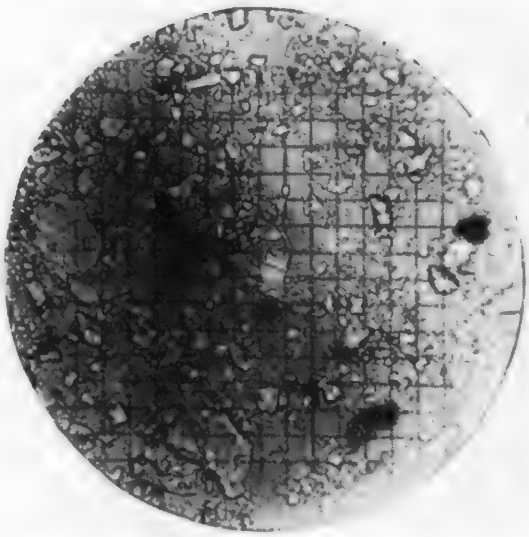


Fig. 2.

speeds referred to above, a number of machines in England were equipped with rollers made of special experimental material, in order to ascertain whether the resultant wear on the rollers could be minimised by greater roller hardness and in particular by the alloyed substances intended to improve the toughness of the material.

As a result of the experience accumulated in turning to account the results obtained with these experimental machines, it has become evident that the efficiency of the refiner is limited by the amount of wear on the rollers, and the author hopes, by the design of a new, improved roller, to provide the chocolate industry with a refiner which, in addition to greater output, will also guarantee a longer working life without the results of the refining being nullified through premature wear on the rollers.

Maintenance of Equipment

Experience has shown that the 912 machines should be overhauled after about 7,500 to 10,000 hours in operation. The layman can usually see when repairs have become necessary, the film of chocolate being no longer transferred uniformly from one roller to the other. The expert will notice, before that condition is reached, that the rollers reveal hotter and cooler places. In certain cases, fine crazing will make its appearance on the surface of the rollers. Very often gear noises show that the diameter of the rollers has become smaller through wear. Whereas the crazing must, in every case, be taken as a final warning of the need for repairs, noise in the gears must never be lightly disregarded. Usually it points to the fact that the requisite backlash in the gears is either considerably diminished or completely absent. In the latter case, every turn of the roller spindle will cause it to bend, and in consequence will lead sooner or later to the spindle being broken, which will necessitate costly repairs.

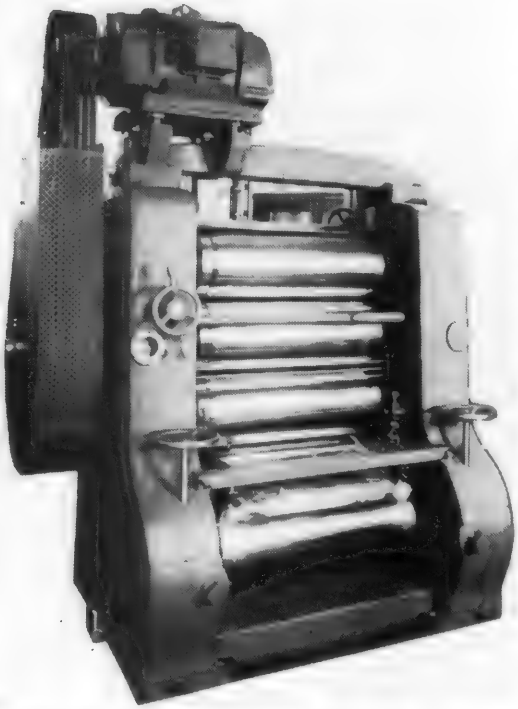
Wear and Tear of Rollers

There is another, though less known, sign of wear and tear of the rollers which, if observed in good time, points even more surely to the need for repairs. If chocolate which has been produced on newly ground rollers which transfer it properly is examined under the microscope, it is found within the field of vision of the preparation that particles of uniform magnitude predominate (Fig. 1).

Within the field of vision of the mass ground on worn-out rollers, on the other hand, in addition to the particles of normal average size, a considerable number of particles can be seen which are appreciably larger. These particles are naturally perceptible to the tongue when the chocolate is eaten and the chocolate tastes coarse (Fig. 2).

To counteract this drawback and reduce the coarser of the chocolate to a standard size answering the particular requirements, the rollers have to be set closer together, the result of which is to reduce the output and increase the power consumption. Such uneven chocolate can often be observed even when the film of chocolate is transferred uniformly from one roller to the other. This is attributable to the fact that the defects in the rollers caused by wear are, to a certain extent, compensated and are not therefore visible; nevertheless, they lead to the unfavourable grinding result referred to above.

When carrying out repairs to a refiner, the inside of the rollers must, in any case, be carefully cleaned



The new five roller chocolate refiner known as the 1950 TM.

with hydrochloric acid or with a caustic soda solution. Simple rinsing out is not enough, since there will have been formed inside the rollers fur of calcium or other deposit which can only be removed by taking out one of the spindles in each roller and thoroughly cleaning the inside with a brush. Special allowance has been made to meet this requirement in designing the roller in question inasmuch as the spindles are secured in a special way by means of screws.

Replacing the Spindles

The replacing of the spindles, however, calls for the greatest possible care, as they must run perfectly true, and during rotation must not reveal a deviation of more than 2/10,000ths of an inch. The rollers must then be subjected to a grinding process specially evolved for these machines. In any case, the gears must be re-cut to ensure a backlash determined as the result of experience. As a general rule, the side walls of the feed hopper and the water pipes for the rollers must be expertly repaired. Occasionally special attention has to be paid to worn-down gear seatings. They can be built up with the aid of a metal spraying process and then ground to their original diameter. The centre bores in the gears can be repaired by fitting new bushes.

When carrying out repairs it is always advisable to find out if the working conditions are correct for the particular machine. If not, an alteration can be simultaneously made in the gears ratio so as to benefit by the latest experience in the saving of power and protection of the material of which the rollers are made.

In some cases it will also be necessary to fit new rollers. On opening them it has often been found that the inner walls have undergone changes due to corrosive or other processes which have not yet been fully elucidated, and in consequence they no longer possess the requisite conditions for ensuring uniform elasticity and cooling.

It will thus be realised how essential it is for such a valuable machine, of such importance in the manufacture of chocolate, to undergo expert overhaul and careful repairs at regular intervals.

The question has recently been raised: Can the chocolate refiner be dispensed with, if finely ground liquid cocoa and extremely fine sugar are merely mixed together? The reply to this is that, apart from the grinding action, a mixing process also takes place in the refiner, which is impossible of achievement in any other machine. Moreover, during the grinding of the chocolate in the refiner, other secondary effects are set up which, above all, improve the flavour of the chocolate and are therefore of major importance.

It is also a well-known fact that grinding the chocolate twice or more times improves the flavour; that the flavour of the chocolate is improved by grinding with low fat content, and that in this connexion particularly good results are obtained by grinding the chocolate to a high degree of fineness.

It has been established that different methods of making chocolate and different properties of the chocolate mass call for refiners of different gear ratio and roll grinding, and it is hoped to be able to meet all these requirements with the newly designed machine.

Photos Bramigk and Co.

BOOKS RECEIVED

Orders for any of the books listed below or reviewed in this issue may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London W.1. It is regretted that under present conditions it is not always possible to supply books by return of post.*

The Book of the Meat Trade. Edited by Frank Gerrard, M.Inst.M., M.Inst.R., M.R.San.I. Vols. 1 and 2. Pp. 313+xi and 277+vii. Caxton Publishing Co. Price £2 17s.

A Study of Certain British Seaweeds and their Utilisation in the Preparation of Agar. By S. M. Marshall, L. Newton, and A. P. Orr. Pp. 184+viii. H.M.S.O. Price 27s. 6d.

Problems of the Fats and Allied Industries

JOHN SEAMAN, A.M.C.T.

One of the most serious aspects in the overall food shortage is that the supply of oils and fats is inadequate and is almost certain to continue so indefinitely by virtue of a radical change in the nature of demand during recent years. This condition has been brought about, partly by an increase of world population of two hundred millions since 1938 but, more particularly, by changes in the political and economic status of the masses throughout the world.

SINCE the First World War, there has been an accelerating trend in the elimination of vast inequalities between national economic classes, nations, and racial groups. Redistribution of wealth in favour of the numerical majority has increased effective demand for all basic commodities, particularly in the West. The political emancipation of the Far East, India, China, and Japan has created further demand not essentially based on money values. There is now little doubt that the change is permanent in character, and that the present disparity between supply and demand for oils and fats for edible use will increase and thus force drastic action to redress the balance.

Some idea of the magnitude of the task now facing the industries concerned may be gained from the following statistics. Before the Second World War world output of all oils and fats averaged twenty-one to twenty-two million tons per annum, of which three-fifths were vegetable and the balance animal and marine. Of this, nearly six million tons entered into international trade, the majority going to Europe. It is now generally accepted that these quantities were quite inadequate for the maintenance of full health even in the favoured countries of Europe. The U.S.A. enjoyed by far the best position in fats consumption by virtue of natural resources, particularly in animal fats, but even so some 20 per cent. of the population were limited by buying capacity.

Losses through War Damage

Destruction of plantations in the Far East by the Japanese and general dislocation of international trade and shipping have very considerably reduced even the inadequate pre-war level of fats consumption in most countries, particularly in Europe. In 1946, total world output was less than 18 million tons, and the proportion exported fell by more than a half to two and three-quarter million tons. Of the total loss, that of vegetable fats was two and a quarter million tons. The consequences of these losses are all too obvious in Europe, where fat imports have fallen to 75 per cent. of pre-war level even in the victorious countries, and to as low as 50 per cent. in Germany and Italy.

The consequences of deficiency in the proportion of fats in human diet are not fully understood, but it is generally accepted that one-third of the total food consumed should consist of fats. In most countries about two-thirds of the necessary fat content is normally consumed in meat and other forms, the balance being made up by processed fats in a form of margarine, cooking fats, and so forth. It is agreed that fat in adequate quantity is essential to the full growth and health of children. The tasks of world fats and allied industries in correcting the present serious state in this connexion must rank among the most important in the overall food problem.

Lines of Approach

The main lines of approach in reducing the present wide gap between supply and demand in order of probable early effectiveness are:

1. Maximum replacement of oils and fats in detergents by synthetics.
2. Total elimination of potentially edible oils in the manufacture of paint and other industrial products.
3. Concentration on efficient methods of harvesting, extraction, refining, and transport of all glyceride oils with a view, primarily, to the preservation of their edible content.
4. The development of new sources of vegetable oils and fats.
5. The development of additional fats from marine sources.
6. The development of additional fats from animal sources.
7. Concentration on the reduction of loss and depreciation of the potentially edible content in all manufacturing processes.
8. Maximum preservation of food value of oils and fats in all consumption processes.

Development of Synthetic Detergents

Fat shortage during the First World War led to an appreciable rise in output of the so-called synthetic detergents, but as natural fatty materials again became available at economic prices for non-edible use, the demand fell away to practically nothing in 1928. From then until the commencement of

Deodoriser with gas-fired superheater.
Photo Rose, Downs, and Thompson.

the Second World War, output rose gradually but with a sharp upward trend from 1936 as war preparations curtailed fat supplies and threatened still further cuts. In the U.S.A. the annual output of synthetic detergents rose to about fifty thousand tons in 1943, and is expected to reach nearly two million tons per annum in the next ten years.

Production of Substitutes

Resulting from the forced development of soap substitutes during the war periods, considerable chemical research and plant development have been carried out, resulting in improved detergent qualities and lower manufacturing cost. For many purposes, synthetic detergents are now equal to or better than soap, and their cost is increasingly competitive.

Under any foreseeable circumstances, substantial decomposition of the glyceride content of natural oils and fats is bound to occur. The free fatty acids which result, together with oils rendered inedible in other ways, must provide the desirable fatty component of detergents in the future. No potentially edible oil should be diverted from its primary function.

As with detergents, the wars forced the development and production of substitutes in other industries which had previously used large quantities of oils for inedible purposes, notably paints. The suspending, drying, and other properties of natural oils can now be approximated without their use, and the objective must be the complete elimination of natural fats for these purposes.

Enormous avoidable waste of fats occurs in harvesting fat-bearing crops as a result of the crude and primitive methods still used. As an example, in the harvesting of the palm fruit, natives usually lop only the top branches and allow them to strike the ground with great force, thereby badly bruising the fruit and leading to hydrolysis of up to 50 per cent. of the glyceride content of the pulp. By the use of nets to break the fall and modern mills in extraction, it is quite practicable completely to eliminate this deterioration and loss. The crude rendering method still largely used throughout Africa yields only about 20 per cent. of the fat content of the fruit and even that is sadly deteriorated by the time it reaches the refineries of Britain.

Similar though lesser losses occur in the case of animal and marine fats, and it is probable that not less than ten million tons per annum of all natural fats were lost to edible use throughout the world before the Second World War.

The following brief analysis of the treatment of natural fatty materials from their origin to the point of human consumption indicates only the major items of potential loss and depreciation to which they are susceptible.

Animal and Marine Fats

The bulk of animal and marine fats is at present extracted from fatty tissues by comparatively simple boiling and steam rendering. The resulting upper layer of fats is decanted from the boiler or still into receivers. The middle aqueous layer, containing appreciable glycerine, is usually run to waste and the lower layer, or foots, collected and sold as such.

The extraction is generally carried out at, or above, atmospheric pressure, with the result that hydrolysis occurs to an extent directly proportional to time (usually several hours) and temperature (about 90° C.), the resulting oil stock containing free fatty acids to the extent of anything up to 10 per cent. The glycerine thus produced is almost invariably passed to effluent in the boiling-water or condensate together with dissolved fatty materials and other valuable food elements.

Given that the prime objective in fat extraction and refining is to obtain the maximum yield of *edible* fat, all processes which promote hydrolysis are to be strongly condemned. The essentials in the treatment of animal, marine, and such vegetable fat-bearing tissues as palm fruit pulp are to:

1. Raise the temperature only just sufficiently to cause the expanding oil to soften and break the retaining tissue.
2. Promote the continuous removal of water vapour.
3. Promote the separation of oil from tissue by physical means.
4. Continuously remove oil from the relatively high temperature zone.

These conditions can obviously be achieved in many ways. A procedure found quite effective

consists of the following modifications to conventional steam-rendering equipment.

1. The replacement of water by a solvent which is (*a*) hygroscopic, (*b*) a good heat conductor, (*c*) has its boiling point appreciably above operating temperatures and above that of the most volatile glyceride constituent of the oil.

The solvent should permit of subsequent fractional separation of its glyceride constituents on the basis of decreasing solubilities of higher molecular weight fractions with increase in temperature. It should also permit of simple separation from water for its recovery from the evacuation system.

2. The employment of vacuum equipment for the continuous removal of the moisture content of the oil-bearing material.

3. The employment of a beater mechanism to promote the removal of oil from tissue.

Residual oil and solvent are removed from the final pulp by means of screw expellers located at the base of the still. So far, it has been necessary to use two solvents, one as the heating medium and the other for refining and fractionation, but there is good promise that the use of a single solvent will be possible.

Vegetable Fats

Primitive methods in the harvesting and extraction of oil from vegetable sources are still carried out by native labour with but little supervision. In West Africa in particular there has been little improvement for centuries. In the Far East better results are obtained from poorer raw materials, but even there the loss and depreciation of edible content are serious.

The treatment of most vegetable raw materials to their final edible state is infinitely more complicated than for animal, marine, and similar vegetable fats. The following brief list of the major operations to which the raw materials must be subjected will indicate how considerable are the consequences of current ill-treatment. It will be apparent that such involved procedures could only be carried out satisfactorily in the most modern extraction and refining plants under the supervision of highly skilled chemists and engineers. In this field, which constitutes the greater part of world output of oils and fats, the case for the establishment of such factories in close proximity to the sources of oil-bearing plant life is overwhelming. Subsequent transport to finishing factories throughout the world of the refined oils and fats should be carried out in refrigerated vessels of inert material.

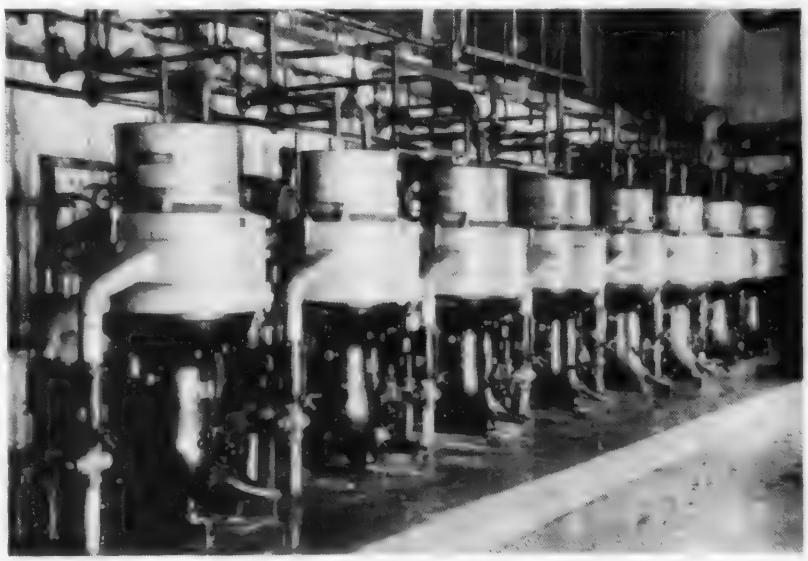
Preliminary Operations

1. *Separation of foreign matter.* By strainers, air separators, magnets.
2. *De-linting.* The removal of fibrous hairs, *e.g.* from cottonseeds.
3. *Decorticating.* The separation of shell from kernel in disintegrators, roller mills, cylindrical hullers, *e.g.* palm kernel.
4. *De-germing.*
5. *Milling of oil-bearing material.* (*a*) Crushing between smooth and/or fluted rollers. (*b*) Grinding in disc grinders, etc.

Extraction and Refining

The most widely used method of oil extraction is the use of pressure, either on the whole or ground and cooked fatty material, in hydraulic presses or screw expellers. At present, a very simple classification scheme is adopted in that cold-pressed oil is regarded as potentially high-grade edible oil, while that expresed in subsequent pressure operations at elevated temperature is either regarded as inedible or containing only a relatively small proportion which can be rendered edible by subsequent extensive treatment.

The second major method, which is increasingly replacing pressure extraction for the softer, richer, and less resistant fat-bearing materials, is that of solvent extraction.



Centrifugal separators in a Norwegian herring oil factory.
Photo Alfa Laval Co.

Where necessary or appropriate, the expressed crude oil is subjected to:

1. *De-acidification*. The removal and recovery of free fatty acids by their evaporation from the oil, and condensation, sometimes fractionally, at low absolute pressures.
2. *Winterising* The separation of the hard stearins from the unsaturated oleins by cold pressure filtration.
3. *Deodorisation*. Mainly by evaporation of the volatile substances which cause the odour.
4. *Bleaching*. By adsorbent earths and chemical bleaches.
5. *Straining*. A useful preliminary to filter pressing, particularly when gyratory sieves are employed.
6. *Filtration*. In filter presses and self-cleaning rotary filters, with or without filter aids such as kieselguhr, fuller's earth.
7. *Purification*. Chiefly by low pressure distillation.

The nature of vegetable oil-bearing materials to be processed varies so widely that there is no standard treatment in which all the above items can be simply combined. In the past, caustic soda washing, followed by bleaching by diatomaceous earths or activated char, deodorisation, and filtration, was the most general practice. Like the kettle saponification method of soapmaking, the final result has been fairly satisfactory, but such a procedure does not achieve the standard of edible utilisation of glyceride content necessary to the changed conditions in the post-war world.

New Overall Process

The vital need to preserve the maximum food content of oils and fats is gradually forcing the adoption of more precise, scientific treatment throughout the whole range from raw materials to finished product. Broadly the trend is towards:

1. The reduction of spontaneous hydrolysis and loss of nutritional and medicinal elements of animal, marine, and some vegetable fats by the substitution of heating and solvent mediums other than water and steam in rendering processes.
2. The reduction of temperature in pressure extraction from vegetable oil-bearing materials and the extension of solvent extraction and cold fractionation.

Probably the most promising line of approach to a new overall process, incorporating several of the essential operations, is the improvement of processes and equipment for continuous solvent extraction and fractionation. The Solexol process is an example. Temperatures are lower than in most refining methods, and it can be employed, in various forms, to substantial sectors of the treatment of animal, vegetable, and marine fats. A special grade of liquid propane is the solvent. At low temperatures it mixes with glyceride oils in all proportions, but as the temperature is raised the components of higher molecular weight are precipitated progressively, thus achieving selective extraction. Costs range from a fraction of a ½d. to 1½d. a gallon of oil processed. Crude soya bean can be extracted so that 67·5 per cent. is edible; 30 per cent. is suitable for paints and other products; 1·5 per cent. contains colour pigments in high concentration, plus lecithin; 1 per cent. is rich in sterols useful in the synthesis of hormones and other pharmaceuticals; with linseed oil, the yield is 98 per cent. of a light-coloured, ash-free product.

Low grade tallows and greases yield 99 per cent. premium white products for soaps; fatty acid colour bodies are removed in a 2·5 per cent. fraction, and the 97·5 per cent. of decolorised material may be separated into stearic and oleic acids. From low vitamin sardine body oil, a concentrate 9 per cent. weight is obtained which has 3,500 units of vitamin A and 1,000 units of vitamin D per gram; 47 per cent. emerges as a tung oil extender, 5 per cent. as stearin for edible products, 1 per cent. as fatty acids, and 3 per cent. as colour bodies.

Fractionation of shark liver oil gives a vitamin A concentrate with 500,000 units per gram, sixteen times the potency of the crude oil, and comprising 5·6 per cent. of this oil by weight; another 1·4 per cent. is separated as stearin, and the residual oil is a useful drier.

Development of New Fat Resources

The measures thus outlined, with their logical extensions, are those calculated to yield quick results by the application of up-to-date science and technology in industries which have hitherto been particularly loath to depart from conventional methods which had a sound empirical basis. What may have been a justifiable scepticism of unproven methods has now become an obstinate refusal to accept and apply scientific methods which have been proved effective beyond doubt in other industries. The urgency of the problem now makes complacency or timidity quite intolerable, and the practical achievements of newer processes cannot be denied. There is no other way of accomplishing that adjustment between supply and demand in oils and fats which is vital to reasonable nutritional levels for tens of millions of people.

The most obvious ways of increasing fat supplies are:

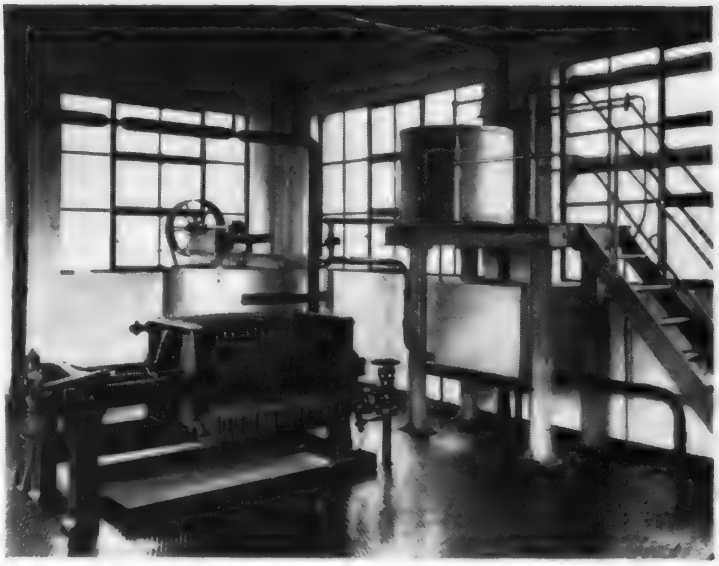
1. Development in the acquisition of oils from marine sources.
2. Increasing world animal population.
3. Establishment of new plantations.

None of these is likely, under present policies, to produce substantial results for several years, as the East African groundnut scheme has shown. In the case of animal fats, it will need a long period of intensive work to return to pre-war levels. There is certainly scope for a substantial increase in oils from marine sources, but measures so far taken are utterly inadequate. At the present rate of development there is no prospect that increase in fat supplies from all natural sources will keep pace with population growth even at pre-war levels. Security of supplies makes the Far East a bad risk for Europe in case of war. The most logical policy for Britain is to increase supplies from the

marine life around her shores and only secondly to pursue the costly and necessarily protracted development of plantations overseas.

By reason of an unbalanced economic structure Britain is particularly vulnerable to curtailments of international trade in fats. Most other European countries have a much greater proportion of agriculture to industry, so that their peoples can consume the vast bulk of their fat requirement from home cattle, pigs, dairy produce, and other native materials. On the other hand, it is reliably estimated that about one-third of the necessary fat intake must come as processed fats in Britain even when the rationing of beef, bacon, and other fatty foods has ended.

In the explosive state of the world which exists and is likely to continue, it is imprudent to place main reliance on fats from overseas. The example of Norway in developing food and fat supplies from marine sources is worth following. Herring oil, which is abundantly available to us, can now be processed by simple and economical methods and would certainly produce far more edible fat during the next ten years than can be expected from the groundnut scheme, and at a fraction of the initial cost.



Neutraliser, caustic tank, and filter press.
Photo Rose, Downs, and Thompson.

The necessary expansion of our fishing fleet and home refineries are tasks which we are well qualified to undertake and early, rapidly increasing results could be practically guaranteed in contrast with the disappointing rate of progress so far experienced in raising imports. Incidental to such a policy would be a valuable alleviation of the present shortage of cattle feedingstuffs, in the form of fish meal, which could lead to an appreciable increase in our livestock and hence to additional high quality edible fats. These considerations and others constitute a solid base for an immediate, intensive drive in this direction. Equipment manufacturers, particularly, should lose no time in exploring this field. Otherwise unnecessary delay will occur in bringing this country to the level already reached in Norway.

Elimination of Loss in Food Processing

There is considerable loss and depreciation of fats in the processing of food. Perhaps the greatest loss occurs through improper storage and handling arrangements. Besides direct loss, hydrolysis and rancidity account for many thousands of tons annually. These subjects are not yet fully understood, but the empirical methods for the more efficient manufacturers are a guide to the majority. Generally, refrigeration and humidity control are essential for the liquid oils, fats, and such fat-bearing material as cocoa beans, groundnuts, ground coconut, and soya bean. Homogenisation of milk after pasteurising considerably improves its keeping qualities. Recirculation and straining of oils used in frying operations preserves its freshness with minimum loss. In large-scale frying the use of extraction and recovery equipment for fatty vapours is worth while.

A host of possible economies will be apparent to those familiar with present practice in the fat-using food industries. Hitherto the financial saving has not seemed sufficient to justify the initial expenditure, but the fat shortage has forced some attempt to conserve fats for those processes where their action is vital. Food manufacturers would be well advised to continue the most careful use of fats because it is not likely that there will ever again be any to waste. Recovery of fats from kitchen and other waste, as fat, is another item which must receive considerable attention in the future.

Apart from the loss and depreciation of glyceride content, present practice generally is not adequate for the preservation of full vitamin value. Considerable information on the correct processing of various foods, from this point of view, is available, but it has only reached the application stage in a very few organisations.

Synthetic Fats

Substantial progress was made in Germany in the manufacture of fats from by-products of the

Fischer-Tropsch process, primarily concerned with the production of fuel. About 7,200 tons of margarine per annum were made from 18,000 tons of the stock, paraffin type hydrocarbon material known as *gatsch*. Subsequent work outside Germany has led to improved processes and products on a small scale. We are still far from being able to reproduce the complete properties of natural material, but some of the important functions of fats in human metabolism can be served. The whole subject of fats in animal metabolism is very imperfectly understood, but the subject is being investigated intensively and the knowledge thus gained is likely to lead to better manufacturing methods in fat synthesis.

High Capital Expenditure

The considerations briefly stated have very important implications for the oils and fats, detergent, paint, food, and other associated industries, in all their phases from raw materials to final products. To make good war-time plant deterioration and to meet the changed conditions, all these industries are faced with enormous capital expenditure in equipment replacement and considerable problems in supplies reorganisations, new manufacturing techniques, retraining of personnel, marketing arrangements, and the ramifications of these major items.

Long-term Policy

Probably the first essential to any hope of an adequate treatment of the numerous and diverse adjustments involved, is a restatement of fundamentals. Of these, the first is, undoubtedly, that present and easily accessible additions to world supplies of natural fatty materials are wholly inadequate to any extensive use for other than nutrition. From this it follows that war-time development and output of synthetic substitutes for all non-edible purposes must not be relaxed but expanded. Secondly, the Western world is in conflict with an imperialism which is rapidly gaining power throughout the areas upon which we previously relied for the bulk of our fat imports. We must, therefore, direct our main attention to promoting fat supplies from areas within our political and economic control. We should also promote a relatively dispersed system of supply and processing with refineries and finishing factories as near as is practicable to supply sources. We must attend to the efficiency and war-time security potential of transport and storage arrangement.

Adjustment to these current realities has scarcely begun, and there is a disturbing tendency to proceed on pre-war lines in acquiring supplies from afar and processing them without due regard to edible priority. Nothing less than a comprehensive long-term plan for the industries concerned is required.

The German Food Industry

THE outcome of an attempt by a team of authors to produce a critical summary of almost every branch of the German food manufacturing industry, as it has been revealed in the various B.I.O.S., F.I.A.T., C.I.O.S. and J.I.O.A. published reports, is contained in a recent Report.* Of the nineteen sections of which the Report is comprised, the first eighteen review different branches of the German industry from the British standpoint, while the remaining section—the Australian contribution—assesses German developments in relation to the Australian food industry.

The Report should be valuable to the British food technologist. Not only should he find an adequate summary of the principal advantages of importance in his own special field, but also he should be in a position, armed with this Report, to survey rapidly all the neighbouring territories of food technology.

The general conclusion that the United Kingdom has not lagged behind Germany but has been ahead in many sections of the food manufacturing industry must not obscure the importance of many new useful features which have been found in most branches by the investigators. The reader should find much of interest with possible application in this country. In the canning field it is clear that Germany placed very considerable emphasis on hygiene, not only as regards plant sanitation, but also with regard to all workers handling food products. The good quality of German fish packs and the interesting ways in which herring was marketed have been specially commented upon by investigators.

One section of the Report covers certain interesting developments of plant equipment, but many other new features will be found dealt with in the particular section covering their main uses, as with chocolate machinery, dehydrating plant, new methods of refrigeration, and the ultra-violet (cold-ray) pasteurisation of milk, to mention only a few.

The whole section on egg albumen substitutes breaks new ground for the British technologist, and in view of the considerable success claimed for many of these products, their further investigation on a wide scale seems to be fully warranted.

* *The Food Manufacturing Industry in Germany during the Period 1939-1945.* British Intelligence Objectives Sub-Committee Overall Report No. 14. Pp. 134. H.M.S.O. Price 2s. 6d. net.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Practical Food Inspection

When a book reaches a third edition in less than six years it obviously fills a need, especially as the public to which it must appeal is small. A useful little handbook* for public health students, which saves them from delving into weighty volumes for essential information, has reached this stage.

The information presented deals chiefly with the examination of meat and fish, from the arrival of animals for slaughter, and the landing of fish, to their sale in the shops. This portion of the volume is generally reliable, although one might wish that the authors were a little more consistent in their scientific language. Most food inspectors think of lymphatic glands and glands as being synonymous, and, while this may be very well in practice, it is better to inform the student that the liver, pancreas, kidneys, and other glands are all glands, though usually looked upon as offal, but that the lymphatic glands have to be examined more critically for signs of disease. The same remark applies to the use of the term *streptococci*, which are described as "pus-producing organisms."

An examination of the few pages given to foods other than meat, poultry, eggs, and fish, and to food sampling, indicates a lack of knowledge of these subjects. A few quotations may be the simplest method of illustrating this point.

P. 109.—"Preserves. Jam and marmalade. Standards: full fruit 30 per cent. to 45 per cent. fruit; lower fruit 20 per cent. fruit. . . . Good jam consists of equal parts fruit and sugar. . . . Gelatine sometimes used for thickening."

P. 110.—"Rhubarb. Stalks only used . . . juice is oxalic acid. . . ."

P. 110.—"All the above known as green vegetables; possess little starch; much cellulose (indigestible) acids, and salts."

P. 112.—"Vinegar. Dilute acetic acid prepared from either fermented grape juice, malt, or the distillation of wood (wood vinegar). . . . Should not contain more than 0·1 per cent. sulphuric acid; this acid may be present in vinegar. . . . If acetic acid content is reduced is paler in colour and has dull or cloudy appearance."

On p. 118 a table is given to show the quantities of foods required for formal samples. A pint of cream, but only 4 oz. of condensed milk, 8 oz. of cordials, 2 pints of sauce, 1 to 2 pints of wine, 12 slices of bread and butter, etc. The student inspector is advised on p. 117 to cut whole fruits into three portions, but the reviewer has yet to meet a sample of fruit where they need to be cut at all. It would be an exceedingly tedious job to cut a pound of currants inside a busy shop!

The need for good books on food inspection was never greater than at the present time, but it is almost heartbreaking to see the number of mistakes in those which are being produced, and it is hoped that authors will examine scripts more carefully. Proceedings under the Food and Drugs Act are for criminal offences, and it behoves those who specialise in the examination of food to see that their own work is above reproach.—Thomas McLachlan.

* *Food Inspection Notes*. By H. Hill and E. Dodsworth. 3rd Edition. Pp. viii+125. H. K. Lewis, London. Price 7s. 6d. net.

Novel Food Preservation

A factory is to be established in Austria for preserving foodstuffs by two processes developed by an Austrian chemist, Dr. Zimmermann.

One is a dehydrating process which is stated to involve the replacement of the water—evaporated in a vacuum at a temperature of from 37° C. to 56° C.—by fat, which is introduced into the cellular spaces during the dehydration process by means of vacuum, and which prevents the cells from sticking together. The fat is subsequently eliminated from the cells, but the protoplasm does not then come away from the cell wall, even though the foodstuffs contract when the fat is ejected. It is the separation of the protoplasm from the cell walls in the ordinary dehydration process that prevents the subsequent natural reconstitution of the vegetables.

The second invention is a method of preventing fat from going rancid without the use of chemicals, *i.e.* halting the decomposition of fat by natural means. By this method such dishes as dehydrated spaghetti and goulash, rice and meat, and bacon and peas can be stored for an unlimited period without being sterilised and without a vacuum. The dishes regain their natural taste when cooked for a quarter of an hour and then left to stand for a further quarter of an hour for further swelling.

The Germans made use of this process during the war years, and by the end of the war some 360,000 tins were produced daily under a secret patent. The rights to this process now having been confirmed by the Allied Authorities, the patents have been transferred to the firm *Internationale Gesellschaft für Gassynthesen* of Vaduz-Zurich, which intends to establish its first plant for the production of the new foodstuffs in Austria. The factory will be relatively small, being designed mainly to demonstrate the process to interested foreign parties.

American concerns are said to be particularly interested in the new process, as are South American meat producers. Experiments made by Dr. Zimmermann during the war are claimed to have shown that meat dehydrated by this process can be restored before use to its natural structure. The meat of a whole ox, dehydrated, forms a block 60 × 60 × 32 cm.; by virtue of the fat stabilisation process, this can be stored for an unlimited period.

The process is regarded as of similar importance in fish preservation.

News from the Industry

FORTHCOMING EVENTS

Instrument Technology

The second meeting of the 1949-1950 session of the Society of Instrument Technology will be held on Tuesday, November 29. A paper entitled "Development of Instrumentation on the Martin Open Hearth Furnace in France," by Messieurs G. Russon and P. Rodicq, will be read by Mr. Fahie.

Society of Chemical Industry

The following meetings are included in the syllabus of the Food Group of the Society of Chemical Industry for 1949-50:

Nov. 4. "Some Present Trends in Bakery Research." Dr. J. B. M. Coppock. Programme will comprise luncheon, visit to biscuit factory, tea, meeting, and dinner. Joint meeting with London Section and London and S.E. Counties Section, R.I.C.

Nov. 7. Jubilee Memorial Lecture. "The Cow—Mankind's Benefactress." E. B. Anderson. 6.30 p.m. at the Royal Institution, Albemarle Street, London, W.1. Joint meeting with London Section and Agriculture Group.

Nov. 9. Conversazione at the Imperial Institute, London, S.W.7. Details to be announced later.

Nov. 23. "Recent Work on the Bacteriology of Pasteurisation." E. B. Anderson and Dr. L. J. Meanwell. Microbiological Panel meeting.

Dec. 7. "Properties of Pectin and its use in the Food Industry." (1) Chemical Composition and Properties of Pectin. Dr. J. N. K. Jones; (2) Laboratory Assessment of Pectin Quality with Special Reference to Jelly Grading. Miss M. Olliver; (3) Distribution, Sources, and Manufacture of Pectin. Dr. V. L. S. Charley; (4) Industrial Uses of Pectin. R. W. Money. Joint meeting with Society of Public Analysts and Other Analytical Chemists.

Dec. 14. Third meeting in series "The Nation's Manufactured Foods."—"Soups as Food." Nutrition Panel meeting.

The programme for the London Section is as follows:

Nov. 4. Joint meeting with Food Group and London and S.E. Counties Section, R.I.C. (see above).

Nov. 7. Jubilee Memorial Lecture (see above).

Dec. 5. "Fibreglass." Joint meeting with London and S.E. Counties Section, R.I.C. (see R.I.C. programme).

1950.

Jan. 2. "Electronic Techniques in Scientific Research." Dr. H. A. Thomas, D.Sc., M.I.E.E., M.I.R.E. 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1.

Jan. 18. "The Physical Chemistry of the Gelatin Water System." A. K. Soper, M.Sc., A.R.I.C. Joint meeting with London and S.E. Counties Section, R.I.C. 6.30 p.m. at the Royal Society of Medicine, 1, Wimpole Street, London, W.1.

Jan. 27. Buffet dance at Chelsea Town Hall, King's Road, London, S.W.3.

Royal Institute of Chemistry

The autumn programme of the London and South-Eastern Counties Section of the Royal Institute of Chemistry is as follows:

Nov. 3. "Careers for Chemists." N. Booth, Ph.D., F.R.I.C. 6.30 p.m. at Brighton Technical College.

Nov. 4. Joint meeting with London Section and Food Group of the S.C.I. (see S.C.I. programme).

Nov. 8. "Careers for Chemists." N. Booth, Ph.D., F.R.I.C. 6.30 p.m. at Norwood Technical College, London, S.E.27.

Nov. 9. "By Sea and Air to South American Oil." (Film and address.) J. S. Parker, M.A., B.Sc., F.Inst.Pet. 7 p.m. at County School, Ridgeway Road, Isleworth.

Nov. 10. "By Sea and Air to South American Oil." J. S. Parker, M.A., B.Sc., F.Inst.Pet. Jointly with West Ham Municipal College Chemical Research Club. 6.30 p.m. at West Ham Municipal College, Romford Road, London, E.15.

Nov. 16. Annual general meeting, followed by discussion of Section and Institute affairs. (Members only.) 6.30 p.m. at the Royal Society of Medicine, 1, Wimpole Street, London, W.1.

Nov. 18. Dinner-dance. 7 p.m. at the Connaught Rooms, Great Queen Street, Kingsway, London, W.C.

Nov. 22. "Leather: Its Constitution and Properties." M. P. Balfe, B.A., Ph.D., F.R.I.C. Jointly with Welwyn Garden City Scientists Club. 8 p.m. at The Cherry Tree, Welwyn Garden City.

Nov. 24. The Chemical Protection of Crops. Brains Trust. 7.30 p.m. at Medway Technical College, Gardiner Street, Gillingham.

Nov. 28. "The Minor Constituents of Coal." A. C. Monkhouse, Ph.D., F.R.I.C. Jointly with Woolwich Polytechnic Scientific Society. 6.45 p.m. at Woolwich Polytechnic, London, S.E.18.

Dec. 5. "Fibreglass." A. M. Robertson, B.Sc., A.M.I.E.E. 6.30 p.m. at London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1. Jointly with S.C.I.

Dec. 13. "Chemistry of Bioluminescence and its Importance in Animal Behaviour." H. A. Klasens, Ph.D. 6.45 p.m. at Philips Electrical, Ltd., New Road, Mitcham Junction.

The Institute of Brewing

Meetings of the London Section of the Institute of Brewing which will be held at the Horse Shoe Hotel, Tottenham Court Road, London, W.1, at 6 p.m., are as follows:

Nov. 14. "English Barleys." H. Leslie Thompson.

Dec. 12. "European Brewery Convention Congress, 1949." B. M. Brown, B.Sc., F.R.I.C.

1950.

Jan. 9. "Comments on the 1949 Hop Crop." Lt.Col. F. N. Richardson.

Feb. 13. "The Research Foundation and its Place in the Industry." Sir Ian Heilbron, D.S.O., F.R.S.

Mar. 13. "Liquor Treatment." J. W. Green.

Apr. 17. "Observations on Glass Washing in Public Houses." H. J. Bunker, M.A. Joint meeting with Incorporated Brewers' Guild.

Dairy Technology Lectures

Designed to provide up-to-date information for persons holding managerial or executive posts in the dairy industry, for dairy laboratory workers, food chemists, public analysts, and others of professional standing interested in milk, two series of lectures on special aspects of dairy technology will be held at the Chelsea Polytechnic, Manresa Road, London, S.W.3, during the Lent and Easter terms. All the lectures will be given in the chemistry lecture theatre on Tuesdays at 7.15 p.m. Details are as follows:

First Series.

November 15. "The Freezing Point Test," by F. J. MacDonald, A.R.I.C. (Milk Marketing Board).

November 22. "The Phosphatase Test," by R. Aschaffenburg, Ph.D. (National Institute for Research in Dairying).

November 29. "The Bacteriological Testing of Ice Cream," by A. W. G. Chetham (Eldorado Ice Cream Co.).

December 6. "The Evaluation of Detergents," by J. C. L. Resuggan (British Hydrological Corporation).

1950. *Second Series.*

February 14. "The Management of a Pasteurisation Depot," by J. Hunter, N.D.A., C.D.A. (Express Dairy Co.).

February 21. "The Management of a Retail Dairy," by J. Ridley Rowling, N.D.D.

February 28. "The Maintenance and Care of Refrigeration Equipment," by H. S. Hall, B.Sc. (National Institute for Research in Dairying).

March 7. "Practical Technical Problems in the Dairy Industry," by J. G. Davis, Ph.D., D.Sc., F.R.I.C. (Express Dairy Co.).

Change in Buying Procedure

In order to effect a greater measure of co-ordination and control of the supplies of certain materials to their associated companies in Great Britain, it has been decided that the Bowater Trading Company shall act as buying agents for such supplies for the parent corporation and the following operating companies of the organisation: Bowaters Lloyd Pulp and Paper Mills; Bowaters Mersey Paper Mills; Bowaters Thames Paper Mills; Bowaters Sales Company; Bowaters Fibre Containers; Bowaters Fibre Drums; Bowaters Paper Bags; Bowaters China Clays.

The procedure now adopted is that orders for supplies to these companies will be issued by the Trading Company; in particular it should be noted that the goods should be invoiced to and will be paid for by this company.

Correspondence in regard to supplies normally will be conducted with the company to whom the goods are to be or have been supplied, but the stores and materials department of the Trading Company will be prepared to deal with any queries.

Ice Cream Sales Convention

More than a hundred of their principal customers attended the Winter Ice Cream Sales Convention of T. Wall and Sons held at the May Fair Hotel, London, on September 22 and 23.

A film, specially produced to illustrate marketing technique and demonstrate the proper manner of handling ice cream in shops, was shown, and after policy addresses from several executives of the firm had been given, discussion groups were formed to examine operating plans in detail.

The principal speakers at the annual company dinner were Mr. J. P. Van den Bergh, C.B.E., Mr. Cecil W. Rodd, the chairman, and Mr. G. A. Stonestreet, the managing director.

Process Plant Auxiliaries

Mainly associated with the food industry as auxiliaries to the usual process plant, the various specialities of Royles include heat exchangers for the heating and/or cooling of liquids, constructed to suit the liquids being handled; steam reducing valves for regulating steam pressure in processing or factory heating; and a complete range of steam traps to suit all conditions for the draining of coils, vessels, or heating mains. In the latter connexion, calorifiers, embodying patent indented tubes, are made in a large variety of sizes and types for the heating of buildings, the medium employed being steam, or high or low pressure hot water. In addition, a full range of storage calorifiers, with steel or copper casings, is available for hot water supplies.

The firm also make a complete range of strainers, both single and twin patterns, while their equipment for the boiler house includes feed water heaters, a special boiler feeding apparatus for handling hot condensate, and boiler level controls.

Electronic Equipment

A representative selection of industrial electronic equipment including Emotrol electronic motor control was exhibited by the British Thomson-Houston Co. on Stand 178, National Hall, at Radiolympia from September 28 to October 8.

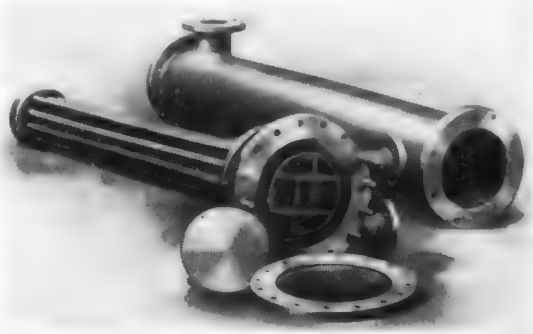
The complete motor control unit comprises the control panel, the remote-control station with stop and start push-buttons and a speed control rheostat, the D.C. driving motor, and, when necessary, a rectifier transformer. It provides automatic speed regulation to within + or − 2 per cent. over a wide speed range, current limit control, acceleration at constant current, and dynamic braking.

New Tyre Tread Design

An important advance in tyre tread design was recently announced by Sir Patrick Hamilton, chairman of Tyresoles. The new "WyresoleS" tread consists of a special coil of wire embedded in the tyre tread. As the tyre wears, these coils wear down into a bristle of thousands of steel points which protrude and grip a greasy or wet road when the tyre tread at the point of road contact is compressed, particularly during cornering, braking, or accelerating.

Official tests conducted by the National Road Research Laboratories and other authorities showed that the grip increased in ratio to the deterioration of road surfaces and driving conditions.

The new tread also shows marked ability to repel stones, flints, or glass.



Heat exchanger for the heating and/or cooling of liquids dismantled for cleaning.

Two 25 cwt. Commer vans for egg deliveries.

Delivery Vans for Eggs

Attractively finished in red with blue and gold lettering, two Commer 25 cwt. vans have recently been delivered to Knights Egg Packing Station, Stowmarket. Each van, powered by an economic four-cylinder engine developing 40 b.h.p., incorporates a four-speed gearbox, powerful hydraulic brakes, and spiral bevel axle with fully floating shafts. Maximum visibility is afforded by virtue of the forward driving position, and a body capacity of well over 300 cu. ft. is made possible.

New M.O.R. Organisation

The products of the M.O.R. Group will now be marketed in the United Kingdom through their new company, Manchester Oil Refinery (Sales).

The management and staff of the subsidiary companies, Petromor, Puremor, and British Transformer Oil and Lubricants, together with all existing facilities, will be used to operate the sales divisions of the new company. These divisions come under the headings of: lubricants; transformer oil; white oils; chemical products and wholesale.

One of the features of the new organisation will be a technical service, working from the refinery itself, and staffed by experts with many years' experience in petroleum technology, industrial processes, and the problems of the lubricating oil trade.

Overseas distribution and sales of the products of Manchester Oil Refinery will continue to be handled by the Raven Oil Co.

Silver Jubilee of Ostelin

The silver jubilee of Ostelin, the first concentrate of vitamin D preparation to be made available to the medical profession, was recently celebrated by Glaxo Laboratories.

The concentrate was first made from cod liver oil by a somewhat laborious process, the extract from several hundred gallons of oil being less than a pint in volume.

Production began at Glaxo's original premises in Osnaburgh Street. Shortly afterwards a small-scale plant was erected at an oil refinery at Thameshaven, but it became evident that if the product was to be manufactured on a large scale, the factory would need to be sited near to a readily available source of cod liver oil. A considerably larger plant was therefore installed on a quayside in Albert Docks, Aberdeen, where about twelve tons of fish oil were extracted every week.

The plant was closed down in 1929 when the process was superseded by an irradiation process. The vitamin is obtained by separating ergosterol from yeast and irradiating it. From this impure irradiated ergosterol vitamin D is then separated in its pure form—crystalline calciferol.

Potato Crisp Weigher

The output of the machine produced by Valley Products (Lye) for weighing potato crisps is 1,000 packets of crisps per hour and not 1,000 crisps per hour as mentioned in the October issue of FOOD MANUFACTURE.

Appointment

Mr. G. W. Soundy, who was appointed to the staff of the technological laboratories of the Printing, Packaging and Allied Trades Research Association early this year, succeeds Mr. H. W. Berridge, D.S.O., D.F.C., as head of technological research. Mr. Berridge is leaving to become assistant manager in the printing works of Lever Bros.

Changes of Address

The Manchester branch of Walworth's, which has been located at 26, Bridge Street, for the past twenty-one years, has removed to Poplar Works, Poplar Street, Viaduct Street, Manchester, 11 (telephone no.: East 2458/9).

The new premises provide more ample accommodation, and are near the industrial districts of Ardwick and Openshaw.

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The Magnetic Valve Co. has now removed from 151, Great Portland Street, London, W.1., to 28, St. James's Place, London, S.W.1. The new telephone number is Regent 7588.

The company is increasing its range of products and now manufactures solenoid operated valves in sizes ranging from $\frac{1}{32}$ in. orifice up to and including 10 in., suitable for the control of the majority of mediums and applicable to all industries.

Employers' Liability

A second edition of *Employers' Liability*, a booklet originally compiled in July 1948 when the changes in legislation relating to workmen's compensation and employers' liability took place, briefly outlines the present position of the employer and gives a concise summary of the new circumstances brought about by these changes.

It deals with the employer's duties concerning the safety of his employees, the increase in common law claims, and insurance against employers' liability risks, and concludes with summaries of recent cases of claims against employers.

Copies of the booklet may be obtained, free of charge, from Hobson Bates and Taylor.

Sales Conference at Sheffield

Announcements that the company will shortly resume their trade in packet peas, and that the whole range of their canned foods will bear attractive new labels in the future were made when Batchelor's Peas held their second post-war sales conference at the Grand Hotel, Sheffield, from September 7 to 9.

In his opening address the chairman, Lt.-Col. M. W. Batchelor, outlined the company's general policy; addresses were also given by directors of the firm during the conference and a film covering the firm's activities during 1948 was shown. On the Thursday evening there was a banquet, during which fifteen representatives, each with more than fifteen years' service, were presented with gold watches by the chairman.

On the Friday morning the representatives visited the company's factory at Worksop to view the battery of "Electric Eye" machines used for the sorting of dried peas.

"Rum Do"

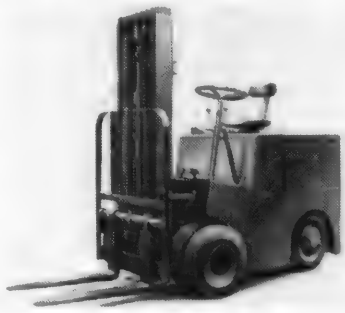
Sixteen prominent members of the West Indian sugar, alcohol, and rum industry were recently entertained by The A.P.V. Company to luncheon at the Savoy Hotel following a visit to the company's Point Pleasant Works.

The purpose of the occasion was to show the major items of a new continuous rum still manufactured for installation at a British Guiana factory. The features of outstanding technical interest in this still lay in the use of the APV-West high efficiency plate design for the rectifying column, the new design of robust, easily cleaned plate used in the analysing column, the use of the Paraflow heat exchanger for feed pre-heating by means of spent wash, and the utilisation of a two-pass open top vertical condenser. The plant is equipped with a fusel oil decanter and a new method of "heads" removal.

The visitors were also able to see other plant under construction for the West Indies, including a complete lager brewhouse, a citrus juice deaeration and pasteurisation plant, and a number of Paraflow heat exchangers.

Highlift Stacking Truck

A modern high-lift electric fork truck with telescopic lifting gear and tilting masts, the Forklift 40 has all the advantages of electric battery drive, and is capable of lifting 2 tons of material 10 ft. in under thirty seconds. The compact design, small turning radius, and telescopic lifting gear enable the truck to be manœuvred and operated in narrow aisles and confined areas, and perfect stability at the maximum rated capacity with load fully elevated and masts tilted forward is achieved.



The forks can be quickly adjusted laterally to suit varying dimensions of pallets or loads, and they can also be removed and replaced speedily by other fittings such as crane attachments.

The truck, which is made by Ransomes, Sims and Jefferies, was exhibited for the first time at the recent Engineering and Marine Exhibition.

Seaweed Research

Laboratory-scale work on extraction processes for chemicals has been started by the Scottish Seaweed Research Association organisation, according to the annual report, and good progress has been made. The report also confirms that the volume of seaweed is adequate for the maintenance of a major chemical industry, provided the successful and economic harvesting of sublittoral weed can be achieved.

Plans have been prepared for a new semi-technical laboratory for investigation into algal chemical extraction processes on a larger scale than is possible at present. Work will begin on this immediately permission is given for the erection of the buildings.

Twenty-one Years' Service

On September 24 last, approximately twenty-eight years since Boxfoldia came into being, the directors entertained those members of the organisation who had been with the company for more than twenty-one years.

Presentations of service badges and brooches were made, and the directors expressed appreciation of the work of those who had played an active part in the rapid development of the company.

Afterwards the party saw a performance of "Bless the Bride."

Ice Cream Factory for Stepney

Formerly manufacturing ice cream in the basement of their shop, the firm of S. Steinhart, established for forty years, recently witnessed the culmination of their efforts when their new factory, considered to be the most modern plant of its kind in the East End of London, was officially opened.

After a short speech by Mr. R. T. Clark, whose firm, the Creamery Package Manufacturing Company, had supplied much of the equipment, Mr. R. Johnson, secretary of the Ice Cream Alliance, spoke of the position of ice cream manufacturers today. Equipment and premises were not the only necessities for good production; the personal element was possibly just as important, and he had been pleased to learn that the staff of the new factory were fully acquainted with the operation and cleaning of the apparatus and the precautions necessary to produce a high quality product.

Dealing with the new heat treatment regulations, Dr. Cauchi, Ministry of Health, stressed the fact that it was vitally important to instil into food handlers the same unconscious habits of cleanliness that medical students in operating theatres had to observe.

Miss Weeks, representing the Ministry of Food, and Mr. J. White, President-elect of the Society of Dairy Technology, also spoke, after which one of Mr. Steinhart's three sons described the progress made by the firm.

Mr. Johnson then declared the factory open, at the same time pushing a button which set the continuous freezer in motion, and he wished the firm every success in the future.

The Dairy Show, 1949

Enterprise in the field of dairy equipment was evidenced by exhibits at the sixty-third annual Dairy Show, held on October 25, 26, 27, and 28. The Show occupied the whole of Olympia and visitors were able to see many new developments in plant for the dairy industry.

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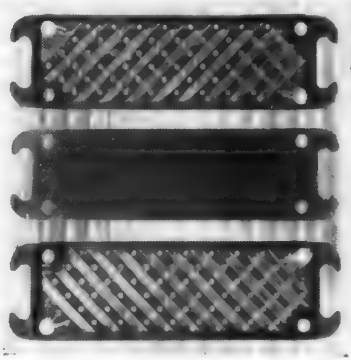
A range of modern processing equipment for milk, ice cream, and liquid foods was exhibited by the Creamery Package Manufacturing Company.

An interesting feature of their milk pasteuriser and ice cream mix pasteurisers is that the heating is now being performed by the circulation of steam vapour; this enables the pasteurising temperature to be reached in approximately fifteen minutes.

Of particular interest to ice cream manufacturers was the fruit feeder for the continuous feeding of fruit, nuts, and sweets into ice cream as it is pumped direct from the freezer.



Creamery Package heat exchanger plates.

Specially designed to meet the need for a plate unit of capacities from 100 to 500 gallons per hour, the multi-pass heat exchanger shown incorporates a flexible flow design. A unique feature is the use of smooth flat plates for heat exchange purposes, with a gasket carrier between each pair of plates to provide the necessary seal to the circuit and also ensure turbulence in the product being treated and in the heating or cooling medium.

The instrumentation used is all electrically controlled; another interesting feature is the solenoid-operated flow diversion valve, which obviates the need for gland packings.

A further development to be seen was a flavour mixing vat, displayed in 10 and 20 gallon sizes.

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All-purpose Machines

Many types of ice cream equipment, including pasteurisers and combined pasteurisers/coolers in which the Silverson machine has been incorporated, were shown on the company's stand. There was a display of all models as well as a demonstration of the machines under working conditions, with samples of emulsified mixes. Featured on the stand was the multi-purpose machine which won the Bronze Medal in the New Inventions Class last year. The company's emulsified ice cream cocktail was served at a "popular bar."

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Milk Processing Equipment

An extensive display of milk processing and handling equipment produced by The A.P.V. Company was to be seen on their stand. Prominence was given to the two sizes of Paraflow H.T.S.T. plants; no important changes have taken place in these plants and the all stainless Type H.M. was shown in a complete 1,200 gallon per hour capacity installation, while the Type H.T.C.A. was shown in a 250 gallon per hour installation. Supporting displays described their construction and operation.

To illustrate the versatility of the Paraflow, all three sizes of the machine were shown in arrangements for various duties such as milk and ice cream cooling and cheese pasteurising. In addition to stainless steel storage tanks, pipe fittings, and pumps, there was displayed some new equipment of particular interest, including a new type of rotary milk weighing and receiving plant, a churn measuring filler, and a cleaning cabinet.

Sterilising Chests

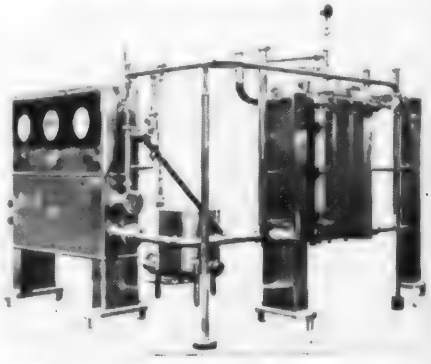
Prominent on the stand of the G.E.C. were two types of the recently introduced dairy sterilising chests.

With the storage block type, sterilising time is reduced to a minimum, and with a load of metal utensils, a temperature of 210° F. is reached throughout the cabinet in from eight to ten minutes. Owing to the low electrical loading it is particularly applicable to installations where it is desired to limit the maximum demand. The water feed is unaffected by furring and is controlled automatically, and no supervision is required during sterilising.

The directly heated chest has a steam generator which consists of a cylinder containing heaters, and there is no restriction on the number or length of consecutive operations it will perform. An improved steam feed reduces sterilising time and electricity consumption, and the water feed is of a new and patented design to counteract furring of the ball valve. A new design of interchangeable hinge and quick action clamp has been fitted to these models and access to all components for installation, operation, and inspection is readily available from the front.

Other exhibits were examples of storage water heaters, electric steam raisers, and a double-rope hoist for sacks and similar loads.

Woods Aerofoil fans for barn hay drying, bin ventilation storage of grain, and for the drying of grain in sacks were displayed, while examples of exhaust fans for ventilating of farm buildings were also included.



A.P.V. all stainless short-time pasteurisation plant.

Display of Cookery Service

A display exhibit, demonstrating the work of the Stork Margarine Cookery Service of Van den Berghs and Jurgens while margarine is controlled, has been on view at Unilever House, London. This is one of a series of displays designed to acquaint the staff of all Unilever companies with the activities of other members of the Group.

The exhibit shows photographs of the factories, and leaflets produced by the Cookery Service. It is transportable, being erected in sections, and will shortly set off on a tour of all the various factories and offices of the Group.

Lighting Schemes Display

A showroom for the exhibition of lighting equipment, and typical motors, instruments, meters, batteries, and rubber cables was recently opened by Crompton Parkinson.

The equipment is installed so as to permit the demonstration of typical results that can be obtained in practice with different lighting schemes. One section of the ceiling has an inset latticelouvre screening fluorescent tubes which enables the provision of large areas of even and diffused illumination.

Indirect lighting is demonstrated by two separate schemes, one using fluorescent tubes in cornice fittings and the other fluorescent tubes and reflectors concealed in wall recesses.

To illustrate the problems that arise in the planning of lighting installations, and the methods of solving these problems, various simple demonstrations have been arranged. The effect of the colour of the light on the colour of the objects viewed is shown by colour comparison cabinets, while other demonstrations show the application of directional lighting to reveal form, and the importance of correct intensity lighting for the clear observation of the detail of moving objects.

A separate section of the showroom contains a range of industrial fittings for filament and discharge lamps, and a slide projector is installed for showing typical industrial and commercial installations planned by the lighting department of the company.

New works of Manesty Machines, makers of tablet machines and automatic water stills.

Engineering Exhibits

A range of fractional h.p. and industrial squirrel cage motors with trip-proof type enclosures were exhibited by Small Electric Motors at the recent Engineering and Marine Exhibition. Sectioned motors were shown to illustrate the bearing and method of lubrication, centrifugal switch operation, and general construction.

To represent their more specialised products the firm displayed electric traction motors for battery operation from their range of approximately 1½ to 10 h.p., with suitable controllers, as well as generators, transformers, and various types of control gear.

The company have recently announced a 10 per cent. price reduction on all their industrial motors. This covers the range of their three-phase type 1½ to 5 h.p. motors with screen protected or drip-proof enclosure.

Electronic Metal Detector

Three-inch nails, sharp-edged pieces of metal, and other objects have been discovered in consignments of fruit and various foodstuffs received for processing by Aplin and Barrett since the installation of an industrial electronic metal detector at their Yeovil factory.

The detector is situated at a point on a conveyor belt, known as the "search head," through which all food for processing is passed. If a metal particle is present, the belt automatically stops, enabling a manual search to be made in the "search head" area. The instrument is of such sensitivity that the presence of a pinhead will automatically stop the conveyor belt.

Photoelectric Methods

Within recent years the advantages of using photoelectric colorimeters (absorptiometers) have been increasingly recognised. A recent book, *Photoelectric Methods in Clinical Biochemistry*, by G. E. Delory, M.Sc., Ph.D., describes methods based on several years' experience with colorimetric analysis of biochemical substances.

Sufficient of the theory and practical details are given to enable the biochemical technician to use photoelectric colorimeters to the best advantage.

Cleansers for Ice Cream Plant

Non-toxic, tasteless, odourless, and non-irritant, two new developments of the quaternary ammonium type of cleanser for use in the ice cream trade are Colifos, a combined detergent and steriliser, and Colinil, a germicide, both in powder form. Colifos may be used for the effective cleansing and sterilising of implements used for serving, while Colinil provides an economical method of sterilising where no greasy matter is present. Wash-water containing either of these products remains sterile as long as it is in use.

A new detergent known as Namfos which is also distributed by G. Havinden is recommended for the cleansing of machinery; this detergent is non-filming and does not act detrimentally on the surface of any metal, and, in addition, contains a large percentage of sodium metaphosphate which neutralises the hardness in the water. It is claimed to give results equal to those achieved by ordinary detergents plus a germicide.

Scottish Industries Exhibition

POST-WAR FOOD DEVELOPMENTS

Buchanan's stand featured a miniature railway track.

The tendency of the main groups of food manufacturers in Scotland to expand their range of products as much as possible was demonstrated by the interesting food displays at the Scottish Industries Exhibition held in Glasgow from September 1 to 17.

An example of extension of production into related fields was provided by McGrouther, Ltd, curers and meat product manufacturers, who showed an attractive range of soups, including chicken, tomato, and kidney.

Little factory production of ice cream has been attempted by Scottish firms to date, but T. Wall and Sons converted the Craigmillar Creamery in 1946 into an ice cream factory and this is now producing brickettes, family bricks, choc bars, and ice gateaux; one such gateau was served on the opening day.

Greater representation was found in the cereal and preserves sections. The stand of James Keiller and Sons concentrated on marmalade, first introduced by Mrs. Keiller in 1797. Paper sculpture was used to show the lady at her jam pot, with the modern factory depicted alongside. An associated company, Crosse and Blackwell, operate a factory at Peterhead, built originally to handle the canning of herring, but now producing other packs. An attractive flat pack, with a tartan design on the label, is being used by this firm to feature Scottish herring in the overseas markets.

An interesting display was that of Powells Products, makers of jams, marmalade, mincemeat, vinegars, and sauces, while McMurray, Ltd., long established in the preserve field, showed their range of products recently expanded to include mineral waters and other items.

The only quick freeze firm exhibiting was Smedley's, whose display was designed to stimulate interest in quick frozen packs and overcome the public feeling that such foods are exclusive.

Responsible for many new developments in the canning and processing of herring, the Herring Industry Board designed their stand to interest the public in herring cookery.

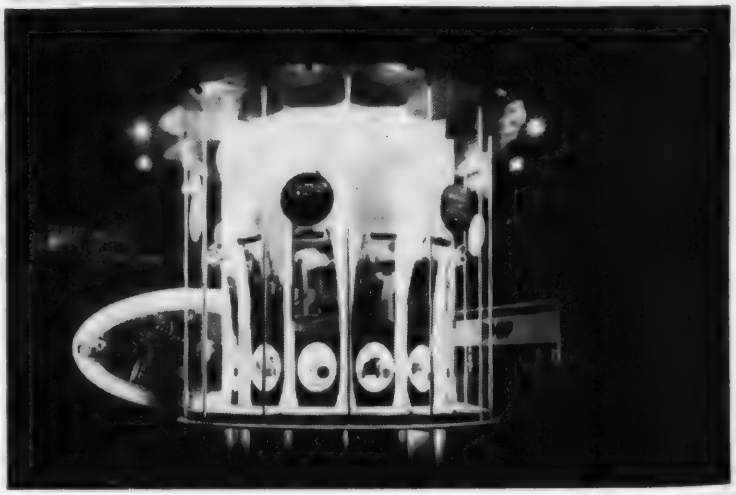
A working packaging show was used by Creamola Food Products to demonstrate the hygienic conditions observed in production.

An extensive range of products shown by Brown and Polson included a canteen mix, specially designed for work where large-scale production is involved. The company outlined the process of preparation of cornflour at their stand and displayed photographic illustrations of dishes, each incorporating one of their products.

The milling industry was repre-

Left: **Crosse and Blackwell's flat pack for Scottish herrings with a tartan design on the label.**

Below: **The Distillers Company's stand stressed the work connected with penicillin, plastics, alcohols, and solvents.**



sented by R. and A. Hannay, who shared the stand of the Galloway Development Association to display their oat products. Shortbread, Dundee cake, crackers, biscuits, and examples of sliced and wrapped bread were shown by Bilsland Brothers; other biscuit manufacturers exhibiting included United Co-operative Baking Society and James Taylor, Wheatholm, Ltd.

The manufacture of whisky was represented by the Scotch Whisky Association, and by the Distillers Company, whose exhibits stressed the work connected with penicillin, plastics, alcohols, and solvents now handled by the group.

Edinburgh rock, Loch Lomond butterscotch, humbugs, and other confections made by John Buchanan and Brothers were to be seen, and samples of cherry bronchial pastilles and mints were distributed to home and overseas trade buyers. Emergency packs for Government contracts were the subject of display and a new line of carton named "Scotch Quiz" made its debut. Demonstrations of the working of a wrapping machine were given at intervals, while a miniature railway track working entirely automatically attracted much attention at this stand.

Maps to show the location of plants, and a large central storage cabinet holding fish and other products on ice, were to be seen at the stand of the Scottish Association of Cold Storage and Ice Trades, representing some twenty cold stores and ice plants in Scotland. A model of a modern cold storage and ice plant was also featured.

Food preparing machinery on view included the patented emulsifier of the Hunter Machine Company which mixes, emulsifies, and homogenises in one unit. Pressures up to 600 lb. per sq. in. can be obtained on standard models, while a wide range of special types is now being produced.

A new air pressure whisk which mixes batters, etc., under an air pressure of 10 to 15 lb. per sq. in. was shown by the Morton Machine Company, as well as their dough breaks fitted with a safety device for the prevention of accidents.

Exhibits in this section also included a new stainless steel 50-gallon pasteuriser introduced by Associated Metal Works.

Message to U.K. Exporters

ADJUSTMENT OF RATE OF EXCHANGE

Exchange adjustment has become necessary as a means of restoring international confidence in sterling and helping to secure an early and substantial increase in dollar earnings. It does not provide any automatic solution of our difficulties; what it does do is to make sterling exports much more competitive in the dollar markets of North America and in the other ultra-hard currency markets, *e.g.* Belgium, Switzerland, and Persia.

The exchange adjustment creates a greatly increased and direct incentive for firms which are exporting or which should be exporting to the dollar markets, and it is imperative that our exporting industries should act swiftly to take full advantage of the new situation.

Exporters who have already established themselves in the dollar markets should be able to feel that their best efforts have been well worth while, for they will now be in a position to operate on a more remunerative basis. Other exporters should be encouraged by the new and more favourable exchange rate and consequent opportunity for profit to divert their selling efforts to the dollar and other ultra-hard currency markets.

The exchange adjustment provides a much greater incentive to sell in these markets, and this is the first task which exporters have before them. If by making use of the new exchange rate exporters find that they can greatly increase their dollar sales, then they must go all out for this objective, and there should be no holding back because of losing ground in other markets.

The objective of every exporter must be to intensify his selling effort in such a way as to secure the maximum dollar receipts. The prices of most British exports to North America are quoted in sterling but are payable in dollars or United States sterling at the current rate. There is nothing to prevent our exporters from raising their sterling prices where they already hold an assured dollar market which could not easily be expanded, for example because of production limitations, and it may well be appropriate for a number of exporters to raise their prices in terms of sterling so as to earn something like the same amount in dollars as previously. But buyers in the United States and Canada will probably expect some cut in prices to them and in certain ranges of goods competitive conditions in North America will require reductions in dollar prices, especially where reduction in the dollar price of sterling area raw materials leads to lower manufacturing costs in North America.

Naturally exporters will settle for themselves the most advantageous prices possible in these new circumstances. They will have to take into account any extra costs because of increased prices for those materials which are largely bought for dollars. But the *overriding criterion is the necessity to maximise dollar earnings.* National dollar receipts are the true objective in present conditions, and it is of urgent national importance that this should be grasped and acted upon throughout the manufacturing community. With the new exchange rate it will generally be found that a sales policy designed to secure maximum dollar revenue for the nation will also bring about maximum sterling revenue to the firm concerned. A vast number of British exporters will now have a real and immediate incentive to go all out for increased exports to dollar markets with the new sterling/dollar rate.

By seizing the opportunity thus presented to them, they will be able to alter decisively for the better the course of our national fortunes. In these circumstances it becomes more than ever important for manufacturers to review their production and selling programmes so as to make sure that these are designed to take fullest opportunity of the new situation. Merchandising, design, packaging, advertising, and salesmanship all have a contribution to make, and it is essential to bring them all to the highest pitch of efficiency.

Extract from Board of Trade Journal, September 24, 1949.

COMPANY NEWS

Scribbans-Kemp, Limited

NARROWING PROFIT MARGINS

The twenty-second annual meeting of Scribbans-Kemp, Ltd., was held on September 21 in London, Mr. H. Oliver-King (chairman and managing director) presiding.

The following are extracts from the chairman's circulated statement:

The aggregate profit shown by the consolidated profit and loss account is a satisfactory one, but this profit is the total of profits from a group of companies whose main concern includes such a variety of interests as retail stores, tea, transport, and the manufacture of cakes and biscuits. It has been the policy of the board for some years to broaden the base of this business, and as far as possible we are taking care that your profits are drawn from a variety of interests, which should spread the commercial risk and tend towards stability.

While in the aggregate the profits show an increase on last year, we are experiencing a general narrowing of the profit margins in all our companies, with the result that profits tend to be lower. There has, however, been no decrease in the turnover nor has there been any lessening of the demand for our products. This state of affairs is likely to continue while there is the present shortage of raw materials in the cake and biscuit and other food industries.

As regards our own food manufacturing companies, their production is still limited by shortages in many materials, and during the year there has been no appreciable improvement in the supply of any main product.

The consolidated balance sheet shows group reserves total £3,446,284 which, I think you will agree, is a satisfactory position.

While I cannot, of course, forecast the future, subject to this restriction the "trade winds" appear to be set reasonably fair.

The report was adopted and the interim dividends, totalling 7 per cent. on the ordinary shares and 19$\frac{5}{6}$ per cent. on the deferred shares, were confirmed.

OBITER DICTA

● People in America are already storing meat away in anticipation of another world war.—*Alderman C. W. Hewson of Grimsby.*

● You can lead a boy to the milk, but ten men can't make him drink it.—*Alderman Sir Wilfrid Martineau, chairman of Birmingham Education Committee.*

● We understood there was a food shortage here. We find the British people eat more than we do.—*Mr. Ben Hogan, America's Ryder Cup captain.*

● Sir Stafford Cripps, it is being said in Whitehall, has now added a new dish to his ascetic diet. He is eating his own words.—*Peterborough in the "Daily Telegraph."*

● Nine hundred and fifty-five officials are available to the Ministry of Food to see whether such crimes are being committed as serving asparagus on a separate plate.—*"The Recorder."*

● I am sure every man here longs for a nice big juicy steak. He would never admit to himself that he was taught that the wealthy ate steaks and really it was the thing to do, like wearing a white stiff collar or having frequent baths.—*Dr. Edith Summerskill.*

● Dr. Summerskill has at different times implied that I cannot distinguish between butter and margarine, that my taste must be perverted because I like Gorgonzola and Camembert, that my appreciation of a herring is due to Socialist teaching, and that snobbery is at the bottom of my enjoyment of meat.—*A correspondent to the "Daily Telegraph."*

● Has the suggestion that the Americans are going to invest more capital in the Colonial Empire gone any further than the visit of a few American geologists to Central Africa? Is the sole tangible thing a scheme for fowls in Gambia where we have bought American eggs and American equipment? Is this a sort of operation "Hen Coop" about which we have heard so much?—*Mr. L. D. Gammans, M.P.*

Beecham Group

Shortage of tinplate and poor allocations of raw materials prevented the food division from producing canned foods on the scale for which they were fully equipped, it was stated by Sir J. Stanley Holmes, M.P., the chairman, presiding at the twenty-first annual general meeting of the Beecham Group. Certain alterations in the organisation and management arrangements of the group were being carried out, and special arrangements were being made for the reorganisation and development of their interests in the Western Hemisphere.

After full consideration, it was decided that the directors would not recommend the payment of a final dividend on the deferred shares in respect of the year ended March 31, 1949. Thus the total dividend for the year on the deferred shares was 36 per cent., less tax, as compared with 40 per cent., less tax, last year.

The opportunity was being taken of adjusting the number of interim dividends paid on the deferred shares, and it was intended in future to pay dividends on the deferred shares at half-yearly intervals on the same dates on which the dividends on the preferred and preference shares of the company were paid—April 1 and October 11 in each year.

Booklets Received

An exhibition leaflet illustrating their welded steel boilers, tanks, and vessels including steam jacketed pans for foodstuffs and beer conditioning tanks has been issued by Robert Jenkins and Co. The leaflet also includes a diagram showing the working of the company's centrifugal sugar and salt drier for drying materials of crystalline form.

*

A further publication in the series dealing with the properties and applications of their alloys has been produced by Henry Wiggin and Company.

Nickel—Properties and Applications includes data on mechanical properties of nickel and its corrosion-resistant qualities; in addition its various applications in industry with typical illustrations of equipment in different fields are given.

World Food News

International Plastics Exhibition

The various raw materials and semi-manufactures which they can supply to the Norwegian plastics industry were shown by over a hundred firms from eleven foreign countries participating in an international plastics exhibition held recently in Oslo. Norwegian firms, showing the many finished products which can be made from plastics, were also represented at the exhibition.

Dutch Chemical Directory

The manufacturers, importers, exporters, agents, and wholesalers dealing in approximately 8,000 chemicals and chemical raw materials and products are listed in the *Chemical Directory of the Netherlands* which has been compiled by the Economic Documentation Office, Hilversum, Holland.

Forty-seven of the book's 260 pages are devoted to an abridged list in the English language.

Speeding up Sausage Making

A Chicago meat processing company has eliminated much of the strenuous shovel work necessary in the grinding and mixing of sausages by the installation of two hoists to load barrelled meat into the grinder and dump ground meat into the mixer.

In operation, the barrel of meat is placed on the apron of the hoist and a chain is slipped over the head of the barrel. The ends of the chain are welded to the frame of the barrel holding rack and the loop is just large enough to permit the chain to slip down the sides of the barrel and catch securely on the handles or bulge of the container as it is tilted upwards. The hoist then lifts the bottom of the barrel holding rack and stops when the proper angle for grinder feeding has been reached. To empty all the meat from the barrel, the container may be tilted in a series of lifts to the maximum angle.

The ground meat is dropped from the grinder into galvanised drums. These are placed on the apron of the mixer hoist and secured, and the meat is dumped gradually into the mixer while it is in motion.

Belgian Food Catalogue

Alphabetical lists of associations, manufactured products and their suppliers, and of the leading Belgian food manufacturers are contained in the first edition of a catalogue issued by *La Confédération de l'Alimentation Belge*.

Crop Protection

High hopes are held for the success in Australia of a new American hormone type herbicide. The first trial tests tend to show that it is now economically practical to control turnip weed in cereal crops without harm to either the crop or to stock.

Known as "Vallo" Two, Four-D, the new herbicide was applied by means of a finely coated spray to an oat crop infested with turnip weed. Within a week of spraying, the turnip weed had lost its flowers and had begun to wither, the spray killing the weed by over-fertilising it. In the opinion of the experts conducting the experiments, the spray had no detrimental effect on the oat crop.

Breakfast Foods in South Africa

The production of well-known brands of American corn flake type breakfast foods which was planned some months ago is being successfully carried out and ample supplies are now available. The locally produced corn flakes are being distributed through the usual wholesale channels, and their quality is stated to be quite equal to, if not better than, the imported lines.

Butter v. Margarine

The butter supply position in South Africa has improved considerably in recent months and consumers can now obtain their full requirements. The agitation in favour of making margarine more freely available for all was attacked in a new light recently, when it was stated that the limited margarine now allowed was already proving a competitor to butter, and any further extension of margarine consumption in the Union would be strenuously opposed by the butter interests.

Trade Agreement with Czechoslovakia

ACCORD ON INTER-GOVERNMENTAL DEBTS

A Five-year Trade and Financial Agreement, an Inter-governmental Debts Agreement, and a Compensation Agreement were signed recently in London by representatives of the Governments of the United Kingdom and of the Czechoslovak Republic.

Under the Compensation Agreement, Czechoslovakia has undertaken to pay a global sum of £8 million during the next ten years in measures of nationalisation, expropriation, etc. The Debts Agreement provides a scheme of repayment over a number of years for Czechoslovak Government debts totalling £28 million. Towards all her financial obligations to Great Britain Czechoslovakia will pay £15 million during the next five years.

In order to help Czechoslovakia to meet these payments, and to pay for exports from the United Kingdom and for U.K. trading services, the United Kingdom has agreed to permit the import annually of £3·73 million of Czechoslovak manufactured goods.

The Trade and Financial Agreement provides for the supply to the United Kingdom of essential goods for the first year of the agreement to the value of about £4·8 million, including softwood (13,000 standards) and other kinds of timber, machinery (£250,000), sugar (25,000 tons), and miscellaneous raw materials, industrial goods, and foodstuffs. Czechoslovakia will supply in the later years of the Agreement £4·5 million annually of essential supplies, including softwood, machinery, and foodstuffs.

In each year also, Czechoslovakia will import from the United Kingdom and from the Colonies goods in easy supply to a value of £1·5 million.

Man Eating Shark

Of the very large number of sharks caught annually in South African waters, use has been made only of the liver for the extraction of vitamin oils, the flesh being wasted.

Dr. S. H. Skaife, chairman of the Fisheries Development Corporation, recently condemned this practice. He urged that use should be made of the shark flesh which, despite the strong prejudice against it, was an excellent article of food, which in certain other countries is a common article of diet.

ECA has New Acting Chief

Dr. Burton Baker, of the U.S. Department of Agriculture, has been appointed acting chief of the Food and Agriculture Division of the Economic Co-operation Administration Mission to the United Kingdom.

Formerly head of the dairy branch of the Production and Marketing Administration of the U.S. Department of Agriculture, Dr. Baker served in 1945 as a food processing specialist with the Foreign Economic Administration in Washington, London, and The Hague, and in 1946 as an economist with the Food and Agriculture Organisation of the United Nations.

Trade Mark Controversy

An application by P. Kavanagh and Sons to register the trade mark "Golden Spread" as a name for their glucose syrup has been granted by the Controller of Industrial and Commercial Property in Dublin. The application had been opposed by James Robertson and Sons, of Golden Spread Works, Paisley, for whom it was pleaded that they had used "Golden Spread" as a trade mark for their goods for many years.

For the firm of Kavanagh it was contended that it was 17 years since Robertson and Sons had goods on sale in Dublin, and that there was no evidence before the Court of their coming back.

The Controller said that he did not think that the opposers had a title of goodwill in the Republic of Ireland.

Door for Smokehouses

A new all-steel smokehouse door, with a three-point fastener and inside release handle, has been developed by the Jamison Cold Storage Door Co., Maryland. It is said to be durable, and efficient in establishing a smoke-tight seal.

The new all-steel smokehouse door.

A unique safety feature is the inside release handle that eliminates the need for the emergency release window commonly found on smokehouse doors.

Synthetic Rice

To give effect to proposals for the production of synthetic rice, the Western Australian Government have, according to Mr. A. F. Watts, the State Minister for Industrial Development, agreed to purchase a power alcohol distillery at Collie.

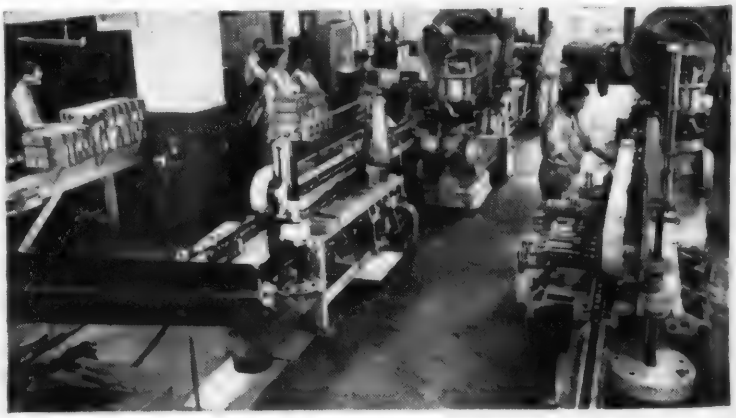
If present proposals reached fruition, 79,000 tons of wheat per annum would be processed and 51,600 tons of synthetic rice, 2,400 tons of ordinary bran and 15,000 tons of high quality cooked bran would be produced. The synthetic rice would find a ready market in the Near East, the Philippines, India, and Pakistan.

Poland Buys Refrigerator Vans

The present fleet of five articulated refrigerator vehicles operating in Poland for carrying pork and bacon to the Port of Gdynia for shipment to Great Britain is to be increased to ten.

These vehicles are each capable of carrying 6 tons of meat at temperatures below freezing point. The tractor section of the 540 cu. ft. refrigerator outfit is fitted with a two-speed rear axle, and worked in conjunction with a five-speed gearbox, thus providing ten forward speeds. Eight to ten ton detachable semi-trailers carry the refrigerator van bodies.

The refrigeration plant consists of a Prestcold condenser driven by a single-cylindered petrol engine. Construction of the van bodies and refrigeration plant is being carried out by Morrisons Engineering.



Installation of pneumatic bottling machines at the plant of L. E. Waterman and Co., New York.

Good Results from New Potato

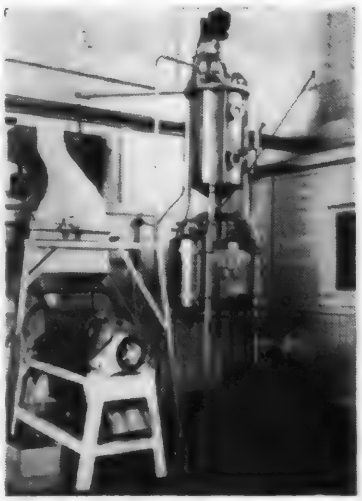
A new variety of potato, named the "Exton," is likely to be grown extensively in Australia when ample supplies of seed have been accumulated. This potato was a selection made from seedlings obtained from the "Katahdin" variety. In one test, less than one bag of seed was used to plant 312 sq. yd., and the resultant crop yielded 21 bags. The variety has been tested by the Victorian Department of Agriculture, and by growers in South Australia and New South Wales, with most encouraging results.

Fruit and Vegetable Research

Serving the commercial fruit and vegetable processors throughout British Columbia and providing information and advice to processing industries in other parts of Canada, the Summerland Fruit and Vegetable Products Laboratory has as its objects the improvement of existing processes and the development of new products. When a new product or process, developed in the Laboratory, has been established on a commercial basis, government inspectors of the Department of Agriculture send their samples for analysis. In this way a check is kept on quality during the experimental stage and after commercial production has started.

The first process, devised by the Laboratory and used on a large scale by industry, concerned the preservation of cherries in sulphur dioxide for ultimate manufacture into *glacé* and maraschino cherries. Until recently processed cherries were imported from Italy and France, but the industry has now achieved considerable economic importance and uses about one-third of the cherry crop produced in the province. Further methods devised by the Laboratory for candying cherries and other bakery products have proved efficient and economical; these are now used extensively in the United States and South Africa as well as in Canada.

Many of the essential features of processes used in the commercial canning of apple juice were also devised in this Laboratory. Using plans prepared by the Summerland staff, eight small, single-line mechanical canneries were established, turning out a high quality product. Other projects include a study of problems encountered in commercial wine making, the preservation of berries with sulphur dioxide for jam manufacture, the retention of nutrient value in processed fruits, the processing of zucca melons for *glacé* fruit, the dehydration of vegetables, the fortification of apple juice with vitamin C, and the preservation of fruits and vegetables by freezing.



Equipment used in carrying out fruit juice experiments.

Although the Laboratory is essentially a research institution two schools are held annually, one for government inspectors and one for mould counters, the latter being for the benefit of control personnel in factories producing tomato products.

Mechanical Engineering

Representatives of sixteen countries and observers from the Organisation for European Economic Co-operation attended the Second International Mechanical Engineering Congress which recently terminated in Paris.

The theme of the Congress was "Production Efficiency," and the papers ranged from a consideration of specific aspects, such as "The Influence of Surface 'Roughness' on the Cost of Manufacture in Mechanical Engineering," to the organisational problems covered by papers entitled "The Introduction of Specials into a Flow-production Line" and "The Application of Mass Production Principles in the Manufacture of Heavy Electrical Equipment." Mr. A. W. Berry, director of the British Engineers' Association, read a paper entitled "The Advancement of Production Efficiency," in which he outlined the many factors in a manufacturing organisation which required improvement in order to achieve a given technical result. The proceedings included visits to representative engineering works in the vicinity of Paris.

Delegate - manufacturers returned to their works from the Congress with many stimulating and new ideas on the question of production efficiency, and it is anticipated that the Third Congress, which is to be held in September, 1950, will secure an even better attendance than that in Paris this year. Particulars of the 1950 Congress may be obtained either from the Secretariat of the Congrès International des Fabrications Mécaniques, 11, Avenue Hoche, Paris (8e), or from the British Engineers' Association, 32, Victoria Street, London, S.W.1.

New Dipping Refractometer

One feature of a new dipping refractometer, developed by Bausch and Lomb, is its prism mount which provides greater interchangeability of dipping prisms and prevents seepage of liquids and vapours into the instrument's compensator parts.

To assure positive contact with the prism mount, thereby eliminating leakage and evaporation of the sample, the metal beaker is attached by a threaded locking ring.

A smaller aperture in the end of the beaker permits the light to enter the sample and prism correctly, cutting stray light to a minimum, thus assuring more accurate results in identifying substances, testing purity, or determining the concentration of some constituent of a liquid.

British Polythene for Poland

Following a visit to the factory by members of the Polish Purchasing Commission, the Polish Government recently placed an order with Tenaplas for nearly £4,000 worth of British-made polythene tubing and fittings.

News from the Ministries

Prices of Sago Flour

The Ministry of Food's selling prices of sago flour were reduced from October 2, 1949. The following example indicates the size of the price reductions:

Ex-store or ex-quay Great Britain.	*Old Price.* (Lots of over 5 cwt.) *Rate per ton.*	*New Price. Rate per ton.*
Sago flour, undressed, unbranded.	£46 5s. od.	£38 os. od.

Canned Fruit and Vegetables

The Canned Fruit and Vegetables Order, 1949, has been amended from September 18, 1949. The effects of the new Order are (1) to prescribe maximum prices for canned pineapple, which is being distributed by the Ministry for the first time; (2) to reduce the maximum prices of imported canned fruit packed in 20 oz. cans and 100 oz. cans; and (3) to free from price control bottled fruit and bottled tomatoes and the varieties of imported canned fruit not specified in the Order.

Ginger, Cherries, and Onions

Changes have been made in the arrangements for the importation in bulk of preserved ginger in syrup from Hong Kong and Australia, and the British West Indies have also been included in the new arrangements. Other changes relate to the importation of drained *glacé* cherries from France, Holland, and Australia, and the importation of dehydrated onions from Egypt.

Provided the applicant undertakes to comply with certain conditions, the Board of Trade will consider the issue of a block licence which will allow the trader to import these commodities from the above-named countries, in accordance with the conditions specified, without having to obtain individual licences for specific quantities.

Bona fide traders are invited to apply for import licences. For administrative convenience, these applications should be submitted to the Import Licensing Department, Board of Trade, through the Ministry of Food, Preserves Division, Import Section, Carlton Hotel, Pall Mall, London, S.W.1. Copies of the appropriate application form ILD/A may be obtained from the Board of Trade, Import Licensing Department, Romney House, Tufton Street, Westminster, S.W.1, or from the Ministry of Food at the above address.

Bread and Flour Prices

The Bread (Control and Maximum Prices) Order, 1947, and the Flour Order, 1947, are being amended so as to provide for the increases in the prices of bread and flour.

Details of the increases, which took effect on September 25, are as follows:

Bread.—The price of bread has been increased at the rate of 1d. per 1½ lb.

Flour.—The prices of flour (including self-raising flour and semolina) sold otherwise than by retail, which are prescribed in Table I of Part I of the First Schedule to the Flour Order, 1947, have been increased by 12s. per sack of 280 lb.

The maximum retail prices of flour (including self-raising flour) prescribed in Part I of the Second Schedule to the Flour Order have been increased at the rate of ½d. per lb. for weights of up to 112 lb. and at the rate of 6s. per 140 lb. for a weight of 140 lb. or more.

Semolina.—The maximum retail prices of semolina (prepacked or sold loose) prescribed in Parts II and III of the Second Schedule to the Flour Order have been increased at the rate of ½d. per lb.

Bread Subsidy.—As a result of the changes in the prices of bread and flour, bakers will on the average receive 6s. more per sack of flour in respect of bread sold at the new prices than they would pay under the increased prices of flour. The bread subsidy in all areas has accordingly been reduced by 6s. per sack from September 25. This adjustment will not affect the discussions about the bread subsidy in England, Wales, and Northern Ireland which were taking place before the necessity to increase prices arose. These discussions will be resumed at an early date.

Flour Restriction Scheme.—The temporary modification of the Flour Restriction Scheme which was introduced after the Chancellor's announcement to protect stocks of flour has been removed.

Import Licensing Dept. Moves

The Import Licensing Department of the Board of Trade (with the exception of the Machinery Section and the staff dealing with European Recovery Programme claims) has been transferred from their present premises in Regent Street, W.1, to Romney House, Tufton Street, Westminster, S.W.1 (Telephone: Abbey 9080). The Machinery Section and the staff dealing with E.R.P. claims will remain at 91, Victoria Street, S.W.1 (Telephone: Abbey 7898).

Bread Subsidy

The arrangements to modify the procedure in assessing the rate of bread subsidy, which was recently discussed with the Bakers' Associations, take effect from March 27, 1949. These arrangements provide that when any alteration in the rate of subsidy is necessary after accounts have been examined, the addition or the reduction will be increased by 50 per cent. for a period of six months. This increase will not be taken into account in the calculation of the rate of subsidy for the subsequent period and will not apply to any special adjustments of subsidy to meet exceptional circumstances. The rate of subsidy from March 27, 1949, to September 24, 1949, has been increased by 7½d. per sack.

Cereal Filler

Following the increase of the price of flour, the Cereal Filler (Control and Maximum Prices) Order, 1944, has been further amended to provide for an increase of £3 10s. per ton in the maximum prices of cereal filler.

This increase will mean approximately only one-tenth of a penny more per pound in the cost of manufacturing the meat products concerned, including sausages. The Ministry of Food does not expect any applications for permission to charge higher prices as a result of such a small increase.

The new prices, which came into force on October 2, 1949, are as follows:

On a sale to a manufacturer or retailer ..	£42 15s.
Any other sale ..	£35 5s.

Imports of Sugar Confectionery

A limited quantity of sugar confectionery will be imported from Turkey and Cyprus during 1949 under specific licence.

Importers should submit samples, together with the manufacturer's name and address, to the Ministry of Food, Chocolate and Sugar Confectionery Division, London Road, Stanmore, for classification.

Applications for import licences on Board of Trade Form ILD/A should be submitted in duplicate to the Import Licensing Department, Board of Trade, 189, Regent Street, London, W.1, but for administrative convenience they should be sent through the Ministry of Food, Chocolate and Sugar Confectionery Division.

Export Licensing Changes

Among those goods which will not now require export licences are malt extracts and preparations, margarine, and butter substitutes, pickles, sauces, and chutneys, laundry starch packed ready for retail sale, and compound cooking fat.

Licences will in future be required for (*inter alia*) certain types of peppers.

In Group 1, the following items are deleted:

> Malt extract and preparations (other than maltose and medical preparations) made wholly or partly from malt extract.
>
> Margarine, and butter substitutes.
>
> Pickles, sauces, and chutneys.

The following are inserted:

> Peppers (including peppers of the piper nigrum), other than capsicum, chillies, red pepper (cayenne pepper), and paprika.

In Group 3, the item relating to dextrine and starch has been amended to read:

> Dextrine and starch (other than laundry starch made up and packed ready for retail sale).

Under the heading relating to oils compound cooking fat has been added to the list of exceptions.

The following items have been inserted in the second schedule: Gravy-making preparations, margarine, and butter substitutes, pickles, sauces, and chutneys, salad cream and mayonnaise, and soups, powdered or canned.

Keeping Quality of Milk

CHANGE IN CONTROL ARRANGEMENTS

The Ministry of Agriculture and Fisheries from October 1 became responsible, with certain exceptions, for the administration of the new Milk and Dairies Regulations and Milk (Special Designation) (Raw Milk) Regulations, so far as these concern dairy farmers. On the same day the National Milk Testing and Advisory Scheme came to an end, and the primary responsibility for maintaining and improving the keeping quality of milk, other than designated milk, passing through depots and dairies has been assumed by the milk industry itself. For this purpose a Joint Milk Quality Control Committee has been set up within the industry consisting of representatives of producers nominated by the Milk Marketing Board and the National Farmers' Union and of distributors nominated by the Central Milk Distributive Committee. Communications to the Committee should be addressed to the Secretary, Joint Milk Quality Control Committee, Milk Marketing Board, Thames Ditton, Surrey.

It is the aim of the industry to expand the testing of supplies as received from farms to ensure a satisfactory standard of marketability, and the arrangements, which relate to England and Wales, are designed to operate to the satisfaction of both producers and consignees. Any complaints that cannot satisfactorily be settled between the dairy manager concerned and the Regional Officer of the Milk Marketing Board, acting for the producer, will be referred to the Joint Committee for investigation. The larger creameries propose to use their own field staffs to carry out advisory work where unsatisfactory supplies are being received; the Milk Marketing Board is prepared to help small buyers by arranging visits to producers whose supplies may be giving trouble. The National Agricultural Advisory Service will be called upon in difficult cases, and will be available to give advice where the producer requests assistance.

The work of the Ministry of Agriculture's National Milk Testing Service will henceforth consist mainly in the regular testing of the milk of T.T. and Accredited producers, including the making of tests where licences are applied for. Dairies and depots with laboratory facilities will, however, in general undertake similar tests as a routine measure, and where this is done the frequency of official testing will be reduced. Whenever the dairy reports a failure, an official test would follow immediately.

Producers not selling milk under a special designation who wish to have their milk tested monthly, will be able to get this done by the Service if they are prepared to meet the cost, and will send their samples to one of the Service's laboratories. Dairies not equipped for milk testing and for which other arrangements cannot be made by the industry, can also apply to the N.M.T.S. to have their suppliers' milk tested monthly. Both of these facilities may have to be restricted if the demand is excessive. The N.M.T.S. will offer any dairy a technical advisory service at a charge designed to meet the cost. Advice and periodic supervision of a dairy's can cleansing arrangements would, however, be undertaken free of cost.

Glass Containers Freed

The Control of Containers and Packaging Order (No. 6) 1949, which came into force on September 12, removes restrictions on the sizes of glass bottles which may be used for the packaging of goods for the home market.

Flour Order Amended

The Flour Order, 1947, has been further amended with the following effects:

1. The compulsory additions to the prescribed prices of flour packed in non-returnable hessian bags are increased by 2d. per bag.
2. The licensed factors' allowance for taking lots of 2 tons or more of flour into their store is increased from 4½d. to 6d. per sack.
3. Traders are allowed to sell prepacked plain (National) flour free from the registration provisions of the Order.

Relaxation of Licensing Restrictions

U.K. FREES HALF PRIVATE IMPORTS

The removal of import licensing restrictions on imports into the United Kingdom of a wide range of goods from countries to which the relaxations can be applied without involving risk of loss of gold or dollars, was recently announced. This covers countries both in O.E.E.C. and in other areas.

The relaxations take the form of the issue of open general licences, valid, with exceptions mentioned below, as from October 3, which will permit anyone to import the goods concerned without the need of an import licence from any country other than the United States and Canada, the Philippines, the dollar account countries of Central and South America (Bolivia, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Venezuela), Argentina, Uruguay, Japan, Iran, Tangier, French Somali Coast, Liberia, the U.S.S.R., Roumania, Bulgaria, Hungary, Czechoslovakia, Poland, the Russian Zone of Germany, Yugoslavia, Albania, and, among the O.E.E.C. countries, Belgium and the Belgian Congo, Luxemburg, Switzerland, and Western Germany.

German goods are excluded for the time being from the scope of the open general licences, but it is hoped that a mutually satisfactory basis to provide for a wide increase of freer trade between the two countries will shortly be found.

The U.K. contribution to this movement towards freer trade covers a wide range of goods, including the following:

Food, drink, and animal feeding-stuffs, including fresh fruit and vegetables, nuts, game, beer, cider, wines and spirits, edible offals, soups, and a variety of canned foods and other items; mineral products and metals, including various unwrought metals, ores and concentrates, pig iron, etc; oils, waxes, gums, and resins; vegetable fibres; chemicals; various types of machinery, including certain agricultural and sugar-making plant; tractors, trucks, carts, various motor accessories, and components; electrical goods such as lighting appliances, batteries, carbons, insulators, wires and cables; metal manufactures, including balances and scales, steam boilers, castings, etc.

A few of the horticultural items will revert to licensing control at certain periods in the year during the main season of home production, the exact limits of these periods being determined later in the light of seasonal availabilities. There will be no such changes before March 31, 1950, except possibly in the case of broccoli, cauliflowers, lettuces, endive, batavia, and rhubarb; importers of these items are advised not at present to enter into commitments extending beyond December 31, 1949.

Pulp paper and board (other than newsprint and insulation board), and paper and board products will be added to the list as from April 1, 1950.

The aim of the O.E.E.C. countries is to achieve as complete a liberalisation of intra-European trade as possible by 1951. H.M. Government will keep under periodic review the goods not included in the present list of relaxations; they will likewise keep under review, in the light of the balance of payments position, the range of countries to which the relaxations apply, and will aim to include, as circumstances permit, all countries willing to trade freely with them without any discrimination that is not strictly justified on balance of payments grounds.

Curry Powder and Ketchup

The Food Standards (Curry Powder) Order, 1949, and the Food Standards (Tomato Ketchup) Order, 1949, have been made under the Defence (Sale of Food) Regulations prescribing minimum standards of composition for curry powder, and for tomato ketchup, catsup, sauce, and relish. The Orders prescribe that curry powder must contain at least 85 per cent. of spices, aromatic seeds, and aromatic herbs, leaving manufacturers free to adjust flavour and pungency by the addition of up to 15 per cent. farinaceous material and salt, and that tomato ketchup and similar products must contain at least 6 per cent. of tomato solids to ensure that the tomato solids content shall not be less than that of fresh tomatoes.

The standards for tomato ketchup, catsup, sauce, and relish do not restrict the use of optional ingredients, *e.g.* sugar, starch, spices, but the Labelling of Food Order will be amended in due course to require a statement of the ingredients of these products to be printed on the label.

The presence of minute traces of lead in curry powder and of copper in tomato products is not uncommon; the Orders therefore prescribe maximum limits for these elements.

In making these Statutory Standards the Minister has acted upon the advice of the Food Standards Committee, which he appointed in January, 1948, to review the composition of foods and to recommend standards based on quality and nutritional value designed to protect the consumer against the sale of inferior products.

The standards prescribed by both Orders will come into operation on the following dates:

Sales by manufacturers	April, 1950
Sales by wholesale ..	July, 1950

Table Jellies

The Food Standards (Table Jellies) Order, 1949, has been made to give statutory effect to standards of composition for table jelly tablets, crystals, and compounds. The standards were previously imposed in manufacturing licences issued under the Manufactured and Prepacked Foods (Control) Order, which was recently revoked. The Order, which is to be read with the Food Standards (General Provisions) Order, 1944, as amended, prescribes:

1. The minimum quantity of sugar which must be present in table jelly tablets, crystals, and compounds.
2. The minimum soluble solids content of table jelly tablets.
3. The maximum starch content of table jelly compounds.
4. A setting test, to ensure that table jelly tablets, crystals, and compounds produce satisfactory table jellies.

The use of farinaceous products in table jelly tablets or crystals is not allowed.

Information and Advice

Synthetic Cream

B.3711. *Can you supply a recipe for synthetic cream using fresh milk and gum tragacanth?* (London.)

The following recipe, in which gum tragacanth might be used, is given for trial:

Liquid milk	...	...	1 qt.
Margarine	...	...	3 lb.
Dried egg powder	...	...	2½ oz.
Gum tragacanth	...	...	2 oz.

The margarine is cut into small pieces and added to the milk together with the gum tragacanth. The egg powder is also added, having been previously mixed into a thin cream with a little of the milk. The mix is then heated to 150° F., stirring continuously, emulsified at that temperature, and then cooled rapidly to 40° F. The cream is stored at that temperature.

This formula gives a good stable product of approximately 35 per cent. fat content.

Information Supplied

B.3597. *Suppliers of extruding machinery for cake decorations.* (Lancs.)

B.3601. *Suppliers of chicken fat.* (Kent.)

B.3606. *Manufacturer of fish sausages.* (Lancs.)

B.3612. *Manufacturers of ice cream cone making machinery.* (London.)

B.3614. *Manufacturers of equipment for sealing cartons.* (Hants.)

B.3617. *Suppliers of cheese flavouring.* (London.)

B.3618. *Manufacturers of two-purpose food packs.* (India.)

B.3622. *Manufacturers of synthetic cream.* (Lancs.)

B.3623. *Manufacturers of potato crisp packing machines.* (Yorks.)

B.3628. *Suppliers of fluorimeters.* (Holland.)

B.3647. *Suppliers of sodium nitrate, sodium nitrite, and moulds for pressing cooked meat.* (Essex.)

B.3650. *Manufacturers of machine for extruding vermicelli.* (Surrey.)

B.3651. *Suppliers of natural grape sugar.* (London.)

B.3652. *Manufacturers of food-preparing machines.* (London.)

B.3656. *Suppliers of gelatine crystals, colours and flavours, trays, and fondants.* (Northumberland.)

B.3657. *Manufacturers of wrapping machinery.* (New Zealand.)

B.3658. *Manufacturers of fibre cases.* (Australia.)

B.3659. *Manufacturers of a machine for skinning onions.* (New Zealand.)

B.3660. *Manufacturers of cocoa bean roasters and winnowing machines.* (Midlothian.)

B.3662. *Manufacturers of emulsifiers.* (Hants.)

B.3664. *Manufacturers of de-fatted and de-bittered soya flour.* (Midlothian.)

B.3666. *Suppliers of measuring taps.* (Wilts.)

B.3667. *Manufacturers of machinery for dating labels.* (Worcs.)

B.3668. *Manufacturers of potato crisp bags.* (London.)

B.3670. *Suppliers of bottled fruit.* (London.)

B.3674. *Suppliers of wire strapping and extruding machinery.* (Sussex.)

B.3677. *Manufacturers of pop corn machinery.* (Lancs.)

B.3678. *Manufacturers of Chellies.* (Surrey.)

B.3679. *Suppliers of hydrometers.* (London.)

B.3680. *Suppliers of canning machines.* (Suffolk.)

B.3681. *Manufacturers of butter brick machinery.* (Ireland.)

B.3683. *Manufacturers of refined table salt.* (India.)

B.3684. *Suppliers of labels.* (Nigeria.)

B.3686. *Manufacturers of filling machines for honey.* (Derbyshire.)

B.3690. *Manufacturers of fish protein for confectionery.* (Warwicks.)

B.3691. *Manufacturers of floor scrubbing machines.* (Kent.)

B.3692. *Suppliers of half-pint cans.* (Yorks.)

B.3694. *Manufacturers of dicing machinery.* (Yorks.)

B.3695. *Suppliers of transparent covers.* (Notts.)

B.3696. *Regulations relevant to jam manufacture.* (Lincs.)

B.3699. *Manufacturers of machinery for icing sugar.* (Sussex.)

B.3700. *Manufacturers of a thermoplastic wrapping.* (Scotland.)

B.3702. *Manufacturers of Christmas cake decorations.* (Beds.)

B.3703. *Suppliers of machinery for the manufacture of pectin.* (London.)

B.3707. *Suppliers of machinery for the manufacture of wheat flakes.* (India.)

B.3708. *Manufacturers of cartoning machines.* (Notts.)

B.3710. *Suppliers of dry yeast for bakers.* (Surrey.)

B.3711. *Manufacturers of cherry stoning machines.* (Durham.)

B.3712. *Manufacturers of soluble casein.* (Canada.)

B.3717. *Suppliers of machinery for malted wheat products.* (New Zealand.)

B.3734. *Machinery for ice cream and potato crisp manufacture.* (Lancs.)

B.3736. *Manufacturers of crimping machines and label moistening devices.* (Scotland.)

B.3738. *Manufacturers of powdered gelatine colours and flavours.* (London.)

B.3739. *Suppliers of candied peel.* (Herts.)

B.3742. *Manufacturers of bottling plants, tinning plants, and small conveying machinery.* (London.)

B.3746. *Suppliers of tripe bleach.* (Cumberland.)

Information Required

B.3758. *Name and address of manufacturers of "Lord" Lightning cheese cutter.* (London.)

Recent Patents

623,339. Bakovenbouw Voorheen, H.P., Den Boer, N.V.: Electric ovens.
623,350. Grossmith, A. C.: Implement for cutting and slicing fruit and vegetables.
627,460. Wingfoot Corporation: Packaging.
627,713. Lazarenko, B. R., and Lazarenko, N. J.: Method and means for producing powders.
627,747. Leader, S. A.: Screw-capped bottles and like containers.
628,388. Marconi Instruments, Ltd., and Jackson, J.: Manufacture of sugar juice.
628,472. Smidth and Co. Aktieselskabet, F. L.: Weighing and packing apparatus.
628,514. General Foods Corporation: Recovery of caffein from coffee products.
628,589. Berkel and Parnall's Slicing Machine Manufacturing Co., Ltd.: Slicing machines.
628,610. Hughes, Ltd., E. G., and Broome, S.: Combined package and display cartons.
628,748. American Cyanamid Co.: Regeneration of anion active materials, particularly for use in sugar purification.

Abstract of a Recent Specification

Common Salt from Brine

The present invention relates to the manufacture of common salt from brine and in particular relates to means for controlling the grain of the salt obtained in evaporating particular kinds of brine.

In present practice open pan salt, obtained by evaporating brine in a grainer or open pan, is produced with the desired grain only when one or more of the following conditions is fulfilled:

(*a*) The brine contains the calcium and magnesium salts which are naturally present in the pumped brine obtained from the wells of salt fields.

(*b*) The temperature of the brine is well below the boiling point.

(*c*) The brine is neutral or slightly acid.

These conditions entail disadvantages, in that (i) when calcium and magnesium salts are present there is objectionable scaling of the heating surfaces (chiefly due to calcium sulphate); (ii) with a temperature below boiling point the rate of evaporation and hence the output of a given installation are diminished; and (iii) neutrality or slight acidity gives rise to corrosion of plant and consequent discoloration of the product.

The present invention relates to the addition to brine of substances whereby the foregoing conditions may be evaded, with consequent avoidance of the disadvantages mentioned.

According to the invention common salt of a desired grain is obtained by evaporating in a grainer or open pan a brine containing a small proportion of either a quaternary ammonium salt one radicle of which comprises an alkyl group of from 8 to 20 carbon atoms or a polyethenoxy compound the molecule of which contains an alkyl group of from 8 to 20 carbon atoms, and not less than 10 ethenoxy groups per such alkyl group.

The expression "small proportion" means a few parts per million of brine used; one part per million is usually sufficient.

In carrying the invention into practical effect the grainer or open pan is filled with brine and an initial quantity of additive is dissolved directly in the brine. During the period of production of salt, additive is put in intermittently or continuously, either directly to the pan concurrently with the addition of feed brine or dissolved in the feed brine.

The salt so obtained has a coarse grain, such as is desired by the fish and other trades.

617,137. *Donald Anderson Crooks, Thomas Reginald Scott, and Imperial Chemical Industries, Ltd.*

Recent patents have been selected from the "Official Journal of Patents" and are published by permission of the Controller of H.M.S.O.

Trade Marks

VALLEY FARM.—658,003. Cooked meats, canned meats, fish, meat extracts, preserved, dried, canned, and cooked fruits and vegetables, jellies, jams, edible oils, preserves, and pickles. **British Canners, Limited,** Widemarsh Street, Hereford; Manufacturers.

CHYPER.—670,375. Food containers (in the nature of wrappings and packings) made of paper or of cardboard. **Cross and Company, Limited,** Bigthan Works, Dunstable, Bedfordshire, and Staple House, 51-52, Chancery Lane, London, W.C.2; Manufacturers.

SOLRAY.—672,143. Flour. **William King, Limited,** Uxbridge, Middlesex; Millers.

EDIFAS.—674,872. Vegetable derivatives for use in food manufacturing processes as binding, stabilising, and emulsifying agents. **Imperial Chemical Industries, Limited,** Wexham Road, Slough, Buckinghamshire; Manufacturers and Merchants.

CONSTEEL.—674,941. Trucks, trolleys, trailers (vehicles), and wheeled platforms for use in factories for stacking goods, all being goods made of steel. **Consteel, Limited,** Empress Works, Penny Lane, Haydock, Lancashire; Manufacturers and Merchants.

CELESTIAL.—675,887. Canned fish. **Sociedade de Conservas "Joana D'Arc," Limitada** (a corporation organised under the laws of Portugal), 662, Avenida Meneres, 650, Matosinhos, Portugal; Manufacturers.

CHEETO.—677,989. Electric food mixing machines. **John Perry and Company (Plastics), Limited,** 105, Baker Street, London, W.1; Manufacturers.

Trade marks have been selected from the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

Poole Brothers (Bakers), Limited. (467607.) Station Road, Squirrels Heath, Romford. Nom. cap.: £1,000 in £1 shares. Dirs.: A. H. M. Poole, Hill House, Hatfield Peveril, Essex; C. W. Poole, 455, Upper Brentwood Road, Squirrels Heath, Romford.

Denny's Bakery (Harworth), Limited. (467638.) Denny's Bakery, Grosvenor Road, Harworth, Nottingham. Nom. cap.: £5,000 in £1 shares. Dirs.: D. J. Carnell, Auriel Carnell, and Mrs. M. E. Carnell, all of Clovelly House, Edenthorpe, near Doncaster.

H. J. Inwards and Sons, Limited. (468053.) 42, St. Mary's Street, Bungay. To carry on business of bakers, confectioners, etc. Nom. cap.: £8,000 in £1 shares. Dirs.: H. J. Inwards (permt.) and Charlotte B. Inwards, 46, St. Mary's Street, Bungay; R. H. Inwards and H. N. Inwards.

Henry Brown (Bakers), Limited. (468109.) 10, Beaconsfield Street, Nottingham. Nom. cap.: £6,000 in £1 shares. Dirs.: Winifred M. Brown, 62, Bobbers Mill Road, Nottingham; A. H. Brown, 3, Johnson Road, Lenton, Nottingham; A. A. Brown, 129, Haydn Road, Nottingham.

C. Graham Williams and Son, Limited. (468184.) To take over business carried on at 30, Bush Lane, Cannon Street, E.C.4, as C. Graham Williams and Co., and to carry on business of importers, exporters, canners, and packers of and dealers in fish, fruit, vegetables, etc. Nom. cap.: £100 in £1 shares. Dirs.: not named. Subs.: J. H. Barnett and A. R. Bent, 27, Old Broad Street, E.C.2.

L.E.B. (Food Products), Limited. (468203.) 123, Pall Mall, S.W.1. To carry on business of manufacturers and merchants and dealers in potato crisps, food products, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: S. Reeves, 161, Drummond Road, Skegness; W. Hussey, 17, Caulfield Road, E.6; H. Failright, 39, Seaview Road, Skegness.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.